नेपाल इन्जिनियरिङ्ग परिषद्

Nepal Engineering Council

इन्जिनियरिङ्ग शिक्षण संस्थाको मान्यता तथा अनुगमन निर्देशिका, २०८१
(स्नातक तथा स्नातकोतर कार्यक्रम)

इन्जिनियरिङ्ग शिक्षण संस्थाको स्नातक तहका कार्यक्रमहरुको मान्यता तथा अनुगमन विनियमावली, २०८१ को विनियम ३(४) संग सम्बन्धित

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Recognition and Monitoring Guidelines for Engineering Colleges, 2024
(Undergraduate and Graduate Programs)

ABBREVIATIONS

BE	Bachelor of Engineering
CED	Continuous Education Division
ISR	Institutional Social Responsibility
CV	Curriculum Vitae
EMIS	Educational Management Information System
HOD	Head of Department
KPIs	Key Performance Indicators
M. Sc.	Master of Science
MoU	Memorandum of Understanding
NEC	Nepal Engineering Council
NeLA	Nepal Library Association
NepJOL	Nepal Journal Online
NGO	Non-government Organization
NPL	National Library Portal
OHS	Occupational Health and Safety
Ph. D.	Doctor of Philosophy
PIS	Public Information System
QAA	Quality Assurance and Accreditation
RMU	Research Management Unit
RND	Research and Development
SOP	Standard Operating Procedure
STEM	Science Technology Engineering and Mathematics
UGC	University Grants Commission
WHS	Workplace Health and Safety

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1. INTRODUCTION

1.1 BACKGROUND

Engineering profession is an important business for overall development of the society and country. Furthermore, it plays a crucial role in driving innovation and technological advancement in various fields. Engineers design and develop new technologies, products, and systems that improve the quality of life, enhance efficiency, and solve complex problems. From developing sustainable energy solutions to designing cutting-edge medical devices, engineering is at the forefront of driving progress. The engineering profession always depends on the quality engineering education system. The better the education system, better the graduate professional. Similarly, the management of the engineering sector including the profession shall be backed by the need-based curricula, advanced teaching method, research and innovation and profession oriented extra-curriculum activities.

In this context, Nepal Engineering Council (NEC) was established to make the engineering profession effective and mobilize it in the systematic and scientific manner. It has mandate to register the individual engineer based on their qualifications. Similarly, it has responsibility to monitor and recognize the engineering degree and academic institutions in Nepal.

There are more than ten Universities offering engineering programs in Nepal. The basic requirements for the recognition of those programs, NEC has developed the procedures and standards to conduct the engineering programs in the respective Universities. These requirements mainly contain the indicators to guide and assure the quality provision of the teaching-learning activities directed towards the graduation of the skilled and an ethical engineer suitable for the country. The NEC Act, 2055 (Amendment 2079) has mentioned the following provisions for the educational institutions:

- Recognition of Engineering Degree or Academic Certificates,
- Recognition of educational institutions,
- Provisions for the regular monitoring of the educational institutions,

These provisions of the NEC Act has intended to enhance the quality of the engineering education in the country. These provisions would be elaborated to attain the goals of the engineering sector in the country. These guidelines are intended to guide the stakeholders for ascertaining the criteria and indicators to support the teaching-learning process for quality education. The quality improvement is never-ending, but the basic threshold shall be maintained to tie it with the recognition of academic institution.

1.2 QUALITY INDICATORS

Main objective of the higher education in Nepal is to make all levels of education competitive, technology-friendly, employment and production-oriented, and to develop human resources according to the country's needs. In line with this aspiration, NEC is also dedicated to support and promote the quality engineering education in collaboration with the Universities. These Universities had offering various areas of the engineering programs in Bachelor's as well as Master's degree programs.

The list of the degree programs of the engineering subjects has been mentioned in the Act, which is subjected to the regular update as per the requirements. The basic requirements for conducting engineering education by the academic institutions have been framed to consider the overall minimum threshold for the major streams of the undergraduate (Bachelor's degree) as well as Masters' level programs. The basic indicators or the provision of assessment of quality of the educational institution has been framed in terms of the indicators. These threshold weights of the indicators may vary for Bachelor's and Masters' Degree programs. The basic quality indicators of the academic programs are listed as below:

- Institutional Policy, Governance and leadership,
- Curriculum management and teaching learning process,
- Research, knowledge generation and extension
- Physical resources,
- Human Resources, and
- Student welfare and support services

The monitoring and recognition of the academic institutions shall be based on these criteria and respective sub-criteria (indicators) mentioned in this document. These guidelines are descriptions of the **'Recognition and Monitoring Bylaws for Undergraduate Programs of Engineering Institutions, 2024'** and **'Recognition and Monitoring Bylaws for Graduate Programs of Engineering Institutions, 2024'**

2. ACADEMIC INSTITUTIONS AND QUALITY ASSURANCE

2.1 COLLEGE ESTABLISHMENT

There are mainly three types of engineering colleges based on the ownership such as university constituent campus/school, public/community and private colleges. The establishment procedure involves several steps depending upon the university and college type. The general outline of the establishment procedure can be mentioned as below:

- Constituent campuses/School: the constituent campus/schools are established by the decision of the governing body/board of the university. It shall be added as part of the

organizational structure to operate it efficiently. In these types of the institutions entire planning and management are the responsibility of the respective school/or faculty. These campuses are adopting the curriculum and other operations as decided by the upper level organizational divisions of the University (such as faculty etc.).

- Community-based colleges: the community-based engineering colleges are initiated by the decision of the community-based organizations, such as Municipalities or by the registered local NGO. The board meeting (ssembly meeting in the case of the Municipality) shall make the decision for establishment of an engineering college. These decisions shall have legal status by registration at the competent authority. These decisions shall indicate the name of the university for affiliation. Then it shall initiate the affiliation procedure to the respective university.
- Private Colleges: Private colleges are established on the legal basis of Private Limited (company registration). The registered private company for this purpose (operating an engineering college) can initiate the affiliation procedure to the university.

These colleges offer various undergraduate and graduate programs in various fields of engineering. These colleges are responsible for the teaching and learning process. The courses and examinations are managed by the respective universities. Similarly, admission requirements and entrance examinations are conducted by the universities. The academic degrees are awarded by the universities.

2.2 QUALITY FOR RECOGNITION

After the establishment of the academic institutions, they shall get the recognition of college based on the NEC bylaws, which is elaborated in terms of the criteria and indicators. These provisions are mainly intended to enhance the quality of academic program for attainment of ultimate goal to produce a qualified engineer in future.

There are other mechanism to maintain and support the quality of higher education in Nepal. University Grants Commission (UGC) has initiated a voluntary process of Quality Assurance and Accreditation (QAA), which is aimed at the self-assessment, review of the quality features by the UGC and certification. The ultimate quality is the confidence and commitment in the institutional as well as academic procedures for their credibility in the competitive environment. Therefore, most of the quality criteria and indicators for the recognition of the academic programs of the respective institutions are mainly taken from the QAA guidelines prepared by the UGC. This would motivate the institutions to get the QAA certification in future.

These guidelines are based on the principles of the quality of academic programs and environment of the institutions. The quality shall be assured by the institutions themselves, then maintained and improved to get the desirable results in long run.

2.3 STUDENT ENROLMENT REQUIREMENT

Universities are assumed to set eligibility criteria for the admission in the Bachelor's degree programs in engineering. The enrollment requirements for Bachelor's degree in engineering (BE) programs are similar for most of the universities in Nepal. As per the Nepal Engineering Council Act, 1999 has given the responsibility to determine the eligibility criteria (minimum requirements) for student enrollment. NEC has set the eligibility criteria for the student to be enrolled for BE programs as below:

- Students must pass I. Sc., or 10+2 (Science stream) from Higher Secondary Schools,
- Diploma in Engineering degree,
- Student must have secured at least second division or equivalent to the grade point system in the examination,
- In the case of degrees from abroad shall have the recognition the by the respective authorities in Nepal,
- Universities regulate enrollment for Bachelors programs in Engineering within their jurisdiction.

2.4 PROGRAM AND CLASS SIZE REQUIREMENTS

Universities are conducting Engineering Programs in the semester system. An academic year consists of two semesters. Colleges shall maintain the number of students as per the approved class-size and number of classes. Each academic programs shall be conducted separately in all disciplines within the limit of class-size. The class-size has been fixed as below:

- Maximum number of students in one class (Class-size) is 48,

The engineering colleges are interested to get the affiliation for the operation of classes on the more engineering programs. It would optimize (sharing of resources among the academic programs) the resources for financial sustainability. The financial status is most important for updating teaching learning resources including the faculty members with the desired qualifications.

In this context, these guidelines have develop some common concepts for the calculations of resource-requirements for assessing the competitiveness of the college and then get the recognition. However, it is not the universal or unique method used for this purpose, and the colleges could develop their status by pursuing the best targets in various criteria including the indicators for the quality teaching-learning process.

2.5 RECOGNITION AND THRESHOLDS

The recognition process of the academic programs and institutions shall be carried out as per the **Recognition and Monitoring Bylaws for Undergraduate and Graduate Programs of**

Engineering Institutions. There are various thresholds depending upon the recognition process. The recognition has been categorized as below:

- Temporary recognition:
  - Temporary recognition: any newly established engineering college are given temporary recognition to start the engineering programs. The temporary recognition is issued on the basis of fulfillment of the threshold criteria verified on the field inspection.
  - Renewal of the temporary recognition: the renewal of the temporary recognition is issued after the regular monitoring of the colleges for the validity of one year,
  - Recognition of the additional programs/additional class-size: the recognition for the additional programs of an existing engineering college is issued based on field inspection against the criteria for this purpose.
- Permanent recognition: the colleges shall upgrade the status to the permanent recognition after the five years of the first time recognition of the programs. The upgrading certificate to the permanent recognition is issued on the basis of the field inspection of resources required for this status.
- Threshold scores for the recognition is given in the table below for various stage of the engineering colleges.
- Threshold score for issuing the recognition is shown in Table 1.

Table 1: Threshold for recognition

S/N	Stage of the recognition	Recognition process	Threshold score
1	Temporary Recognition (for new institute/College)	Field inspection	Minimum 50 % in each criteria and total 60 % in average
2	Continuation of the temporary recognition	Regular monitoring	Minimum 60 % in each criteria and total 70 % in average
3	Temporary recognition of additional programs/ additional Class size	Field inspection	Minimum 60 % in each criteria and total 70 % in average
4	Permanent recognition	Field inspection	Minimum 60 % in each criteria and total 70 % in average
5	Continuation of the permanent recognition	Regular monitoring	Minimum 60 % in each criteria and total 70 % in average

3. QUALITY ASSESSMENT AND CRITERIA

Quality indicators in engineering education are essential for assessing and improving the teaching learning process and outcomes. These indicators help institutions and stakeholders ensure that engineering programs meet established standards and prepare students effectively for their careers. Nepal Engineering Council (NEC) has considered the criteria mainly from the quality perspective of the engineering colleges as well as the prevailing socio-economic constraints in the context of Nepal. The indicators have been briefly elaborated in these guidelines to conduct the field inspection and regular monitoring of the engineering colleges for the purpose issuing the recognition as per the bylaw.

3.1 INSTITUTIONAL POLICY, GOVERNANCE AND LEADERSHIP

Institutional policy, governance, and leadership are important indicators for effective functioning and development of engineering colleges. These aspects are vital for maintaining quality education, research, and overall management within the institution. Institutional governance determines the quality of services it offers. Good governance streamlines the institution towards the operational excellence. Institutional sustainability can be achieved by the executive commitment for good governance by developing and endorsing concerning legal and policy mechanisms.

The overall governance system, policy frameworks, procedural clarity, professionalism, and practices shall be considered in the organizational management. Internal quality assurance and monitoring system, collaboration, participation, feedback system, transparency, and grievance redress mechanisms are major aspects of the good governance in the organization.

Academic institutions are suggested to prepare and implement the following organizational tools, which would ultimately support the performance in terms of institutional strength as well as leadership:

- Institutional prospectus: it includes the institutional vision, mission and objectives approved by the governing body of the college and well circulated among the responsible units of the institution,
- Organizational framework: it shall clarify the roles and responsibilities of each units/braches of the institution,
- Policies frameworks: it includes quality assurance, research promotion, faculty development, employees' bylaw, student support and welfare and others,
- Monitoring and evaluation system: Institution shall develop the well-defined performance monitoring and appraisal system,

- Organizational and professional networking,
- Information systems: it includes the application of the adequate Educational Management System (EMS) and the public information system,
- Student support and scholarship policy: Institution shall develop the student support and scholarship policy and implementation procedures.
- Best practices and leadership aspects: promotion of professionalism, culture of respect and discipline, branding of the institution, focused on the performance outcomes, participation in Corporate Social Responsibility (CSR),

3.1.1 Vision, Mission, Goals and Objectives

Organizational setup is initiated with the well-defined vision, mission and objectives. Engineering colleges typically have specific vision, mission, goals, and objectives that guide their educational and institutional strategies. These statements can vary from one institution to another, however, most common elements of elements that may be appropriate for such institutions as:

A vision is a forward-looking, aspirational statement that describes the desired future state or long-term goals of an individual, organization, or community. It provides a clear and inspirational picture of what the entity aims to achieve or become in the future. Vision statements are often used to guide decision-making, set strategic direction, and inspire people to work towards a common purpose. Generally, vision can be characterized by the following considerations:

- A vision focuses on where the individual, organization, or community wants to be in the future, typically spanning several years or even decades.
- It should be inspiring and motivating, encouraging individuals or members of an organization to strive for a better future,
- It should be clear and concise, leaving no room for ambiguity about the intended future state,
- It should represent a challenging and ambitious goal that goes beyond the status quo and pushes boundaries,
- It should align with the values, mission, and purpose of the entity, providing a sense of purpose and direction,
- A memorable vision statement is easy to remember and communicates the essence of the desired future succinctly,
- It is often timeless and not tied to specific deadlines or short-term goals. It serves as a long-term guide.

The mission of an engineering college outlines its fundamental purpose, values, and goals. While the specific wording of the mission statement can vary from one institution to another, it generally includes the following key elements:

- Engineering colleges are primarily focused on providing high-quality education and training in engineering and related disciplines. The mission statement should reflect the institution's commitment to delivering a comprehensive and rigorous educational experience.
- A mission statement typically emphasizes the college's dedication to the success of its students. This includes not only academic success but also personal and professional development.
- Engineering colleges often have a strong emphasis on research and innovation. The mission statement may highlight the institution's commitment to advancing knowledge and fostering a culture of innovation within the engineering field.
- Many mission statements stress the importance of ethical behavior, responsible engineering practices, and a commitment to societal and environmental well-being.
- Engineering colleges often have a mission to serve the local and global community. This may involve outreach programs, partnerships with industry, and a commitment to addressing real-world problems through engineering solutions.
- Many mission statements now include a commitment to diversity and inclusion, emphasizing the importance of creating an inclusive and welcoming environment for students, faculty, and staff from various backgrounds.
- The mission statement may express a commitment to ongoing self-assessment and improvement, often through accreditation and assessment processes, to ensure the quality and relevance of the programs and services provided.
- In an increasingly interconnected world, some mission statements emphasize the importance of a global perspective, including international collaborations, study abroad opportunities, and preparing students for global engineering challenges.

Goals and Objectives of an engineering college are instrumental in guiding its actions and strategies to fulfill its mission. These goals and objectives can vary from one institution to another, some examples have been shown below:

Goals of an engineering college can be elaborated as below:

- Academic excellence: To maintain and enhance academic excellence in engineering and related disciplines by offering high-quality programs and courses.

- Research and innovation: To promote research and innovation, contributing to advancements in engineering and technology.
- Student success: To ensure that students receive the necessary support and resources to excel in their studies and graduate with a strong foundation in engineering knowledge and skills.
- Ethical engineering: To instill ethics and responsibility in engineering practices, emphasizing the importance of ethical decision-making and responsible engineering solutions.
- Global perspective: To prepare students for global engineering challenges by offering international experiences, collaborations, and a curriculum with a global perspective.
- Diversity and inclusion: To create an inclusive and diverse campus environment that welcomes students, faculty, and staff from various backgrounds and perspectives.
- Industry partnerships: To establish strong partnerships with industries, providing students with real-world experiences, internships, and cooperative education opportunities.
- Community engagement: To engage with the local and global community through outreach programs, service learning, and research that addresses real-world challenges.

Objectives are specific, measurable, and time-bound goals or targets that an individual, organization, or project aims to achieve. They are concrete and provide clear direction for actions and efforts to reach a desired outcome. Objectives are typically a part of a larger plan or strategy and serve as a means to track progress and success. In the context of goal-setting and planning, objectives are often used to break down larger, more abstract goals into smaller, actionable steps. Key characteristic parameters of the objectives are described as below:

- Specific: Objectives should be well-defined and focused on a particular outcome. They answer the question "What precisely do we want to achieve?"
- Measurable: Objectives should include criteria or indicators that allow progress and success to be quantified or assessed. They answer the question "How will we know when we have achieved the objective?"
- Time-bound: Objectives have a set timeframe or deadline by which they are expected to be achieved. They answer the question "By when do we aim to accomplish this?"
- Realistic: Objectives should be achievable and feasible within the available resources and constraints.

- Relevant: Objectives should align with the broader goals or mission of the individual, organization, or project.
- Actionable: Objectives should be accompanied by a clear plan or strategy for how they will be accomplished.

These statements are crucial for guiding the development and growth of engineering colleges, ensuring they provide high-quality education and contribute to the advancement of engineering and technology. Each institution may tailor its vision, mission, goals, and objectives to reflect its unique identity, strengths, and priorities.

3.1.2 Policy Documents

Policy documents in an engineering college are formal written documents that outline the institution's rules, regulations, guidelines, and procedures. These documents are essential for maintaining order, ensuring accountability, and providing clear guidance to students, faculty, staff, and other stakeholders. The specific policy documents can vary between institutions, but common policy areas in an engineering college include:

In an engineering college, policies related to quality, research, and faculty development are important for ensuring the excellence and continuous improvement. These policy explanations can be mentioned as below:

a. Quality assurance policy:

This overarching policy outlines the institution's commitment to maintaining and improving the quality of education, research, and services. It may include mechanisms for periodic evaluation and accreditation. In this policy, college shall develop the action plan for participating in the Quality Assurances and Accreditation (QAA) program initiated by the University Grants Commission (UGC). It includes the assessment and evaluating the effectiveness of academic programs, including student learning outcomes and program outcomes. Similarly, it shall outline the institution's commitment to ongoing self-assessment and improvement, encouraging a culture of continuous enhancement.

b. Research policy

Colleges shall prepare the research policy for effectively managing the research activities and their sustainability. Research policy shall be developed by considering the following aspects:

- Research ethics and integrity Policy: these policies emphasize the importance of ethical conduct in research, including guidelines for responsible conduct of research, authorship, data management, and conflicts of interest.
- Research funding and grant policy: Details procedures for seeking external research funding, managing research grants, and allocating resources for research projects.

- Intellectual property policy: Specifies the ownership, rights, and commercialization of intellectual property resulting from research conducted at the institution.
- Research management policy: it defines the establishment, operation, and governance of research centers and institutes within the college.

c. Faculty development policy

This policy provides the criteria and procedures for professional development of the faculty members including the institutional support for upgrading the qualifications in terms of formal education, external training programs, and fellowships, attending conferences, workshops and seminars.

d. Employees Bylaws

This policy includes the provisions for the recruitment of the faculty as well as the staff of the institution. Furthermore, it shall elaborate the conditions and terms for the services rendered to the specific position. Generally, the bylaw shall consist the following aspects as:

- Performance evaluation and promotion policy: Outlines the process for evaluating faculty performance, providing feedback, and determining promotions, including criteria for tenure and promotion.
- Mentoring and support policy: Establishes faculty mentoring programs, academic support services, and resources to assist faculty members in their professional growth.
- Teaching and learning enhancement policy: encourages faculty to engage in innovative teaching methods, incorporate technology, and participate in curriculum development.

These policies are essential for maintaining high academic standards, fostering a culture of research and innovation, and supporting the growth and development of the faculty. Engineering colleges should have clear and well-documented policies in these areas to ensure consistency, transparency, and accountability in their operations. The specific content and details of these policies may vary from one institution to another. However, the policy implementation, review, updates are also important aspects of the governing body of the institution.

Employee bylaws typically outline the rules, regulations, and policies that govern the conduct and responsibilities of employees at a specific organization, such as a college or university.

3.1.3 Organizational structure

The organizational structure of an engineering college is prepared to follow a hierarchical framework with key administrative and academic departments. A typical example of an organizational structure for an engineering college can be mentioned as below:

Governing board: The composition (members) in the governing board is decided according to the type of the colleges such as: University college/school, constituent college, public college, private/affiliated college. The roles and responsibility of the governing board shall be mentioned in the college formation decision/constitution or other such type of documents.

Principal office: The principal is the top administrative officer of the college. This office oversees and manages the entire college and ensures that all departments and units are functioning smoothly. The administrative division is also taken under the principal's office.

Academic departments/heads: College is usually divided into multiple academic departments, each focused on the specific engineering programs. These departments are mainly responsible for implementation of curriculum and day-to-day academic management. The head leads the department, which is from the faculty of the same field of engineering.

Faculty: Professors, associate professors, assistant professors or and lecturers make up the teaching staff within each department. They are responsible for delivering lectures, conducting research, and supervising students.

Research centers and Institutes: Engineering colleges often have various research centers and institutes that focus on specific areas of research. These centers may have their own directors and faculty members.

Laboratory/workshops: these units are responsible for carrying the subject specific laboratory works and headed by the laboratory in-charges. The laboratory management as well all records of the laboratory or practical works are major duties of the in charge.

Student counselling division: such divisions manage student advices, welfare programs and other activities related to the students' support. This division is responsible for student services; including admissions, advising, career services, and extracurricular activities.

Administrative and support units: These units handle various administrative functions, including finance, human resources, information technology, and facilities management.

Advisory Boards: Many engineering colleges may have external advisory boards made up of industry professionals who provide guidance and support to the college's programs.

Graduate and undergraduate Programs: Separate offices or units manage graduate and undergraduate programs, including admissions, curriculum management, and student services.

Public relations and communications: This unit is responsible for promoting the college, managing communications, and handling public relations activities.

Quality assurance and accreditation: Colleges shall have this unit as per their quality assurance policy. Furthermore, it would be engaged in the accreditation procedures from the University Grants Commission.

The specific titles, organization, and units within an engineering college may vary depending on the college's size, focus, and administrative decisions. Additionally, colleges may adapt their structures to meet evolving educational and research needs.

3.1.4 Performance Monitoring and Appraisal System

An engineering college shall implement a performance monitoring and appraisal system, which is essential for evaluating the effectiveness and productivity of faculty and staff, promoting accountability, and ensuring continuous improvement. The basics of the performance monitoring and appraisal system are mentioned as below.

Goal Setting: Faculty and staff, in collaboration with their supervisors or department heads, establish clear and measurable performance goals and objectives. These goals should align with the college's mission and strategic objectives.

Performance Metrics: Define key performance indicators (KPIs) or metrics that will be used to assess performance. Metrics may include teaching effectiveness, research productivity, service contributions, student pass rates and other relevant factors.

Regular Feedback: it is the process of regular feedback between supervisors and employees, which gives the issues to be improved in the system. This could involve periodic one-on-one meetings to discuss progress, challenges, and achievements. Student feedback on faculty performance, often through course evaluations, can be considered when evaluating teaching effectiveness

Self-assessment: Encourage employees to conduct self-assessments, reflecting on their performance, achievements, and areas for improvement. This can be a valuable component of the appraisal process.

Peer evaluation: In academia, peer evaluation can be an important part of the performance appraisal process. Colleagues and peers within the same department or field may provide input on an individual's teaching, research, and service contributions.

Research output: Assess the quality and impact of research publications, grants, and contributions to the field. This may include publications, patents, research funding, and collaborations.

Service Contributions: Evaluate an individual's contributions to the college and broader academic community through service roles, such as committee participation, outreach, or involvement in professional organizations.

Performance appraisal meetings: there shall be formal performance appraisal meetings, typically annually or semi-annually, where supervisors and employees discuss performance, provide feedback, and set goals for the future.

Professional development plans: Based on the appraisal, create individualized professional development plans that outline the steps employees can take to enhance their skills and address areas needing improvement.

Recognition and rewards: Recognizing and rewarding the outstanding performance, whether through salary increases, promotions, awards, or other forms of recognition is an important factor in the organizational development.

Documentation: The performance monitoring appraisal system shall maintain detail records of the performance appraisal process, including meeting notes, self-assessments, evaluations, and development plans.

Continuous improvement: The system should support ongoing improvements in teaching, research, and service, with a focus on enhancing the quality of education and contributions to the field.

Data analysis: data analysis is useful to identify trends, areas for institutional improvement, and the effectiveness of the performance appraisal system itself.

The specifics of a performance monitoring and appraisal system in an engineering college can vary depending on institutional policies and practices. It should be designed to be fair, transparent, and supportive of professional growth while aligning with the college's strategic goals and values.

3.1.5 Education Management Information System (EMIS)

An Education Management Information System (EMIS) in an engineering college can greatly enhance the efficiency, transparency, and effectiveness of administrative and academic processes. Major components of an EMIS in an engineering college can be mentioned as below:

Student information management: this is mainly consisting of admissions process, including online applications, document submission, and tracking applicant data; student registration, including course selection; recording and updating student grades and generating transcripts.

The academic program management is related to the curriculum management by tracking course offerings, prerequisites, and ensuring curriculum compliance; class scheduling; course evaluations and analyzing student feedback on courses and instructors.

Faculty and Staff Management: this component is for the management of personnel information, payroll, and benefits for faculty and staff; conducting performance appraisals and tracking professional development; posting job openings, receiving applications, and tracking the hiring process.

Library and resource management: this component is for the management of library resources, including books, journals, and digital materials, monitoring and scheduling the use of laboratories, equipment, and meeting spaces.

Financial management: this component of the EMIS, creating and managing budgets for various departments and projects, monitoring expenses, accounts payable, and financial reports.

Data analytics and reporting: it provides real-time data and analytics to support data-driven decision-making for administrators, faculty, and other stakeholders.

The specific implementation and features of an EMIS will depend on the college's unique needs and requirements.

3.1.6 Public Information System

The Public Information System (PIS) in an engineering college serves as a vital means of communication, providing information to students, faculty, staff, prospective students, parents, and the broader public. The basic ways of informing stakeholders about the college activities are mentioned as below:

Website: A comprehensive and user-friendly website is often the basis of a public information system for an engineering college. It should include the following information:

- academic programs,
- admission requirements and procedures,
- faculty and staff directories,
- campus maps and facility information,
- news and updates about the college,
- event - calendar, including lectures, workshops, and open hours, online application and registration forms, resources for current students, such as class schedules, course materials, and academic calendars,
- contact information and inquiry forms for prospective students and parents,
- alumni and donor information, including ways to get involved and support the college.

Social media presence: Active social media profiles on platforms like Facebook, Twitter, Instagram, and LinkedIn can help the college circulating any information/notices a wider audience and share news, events, and highlights.

Email communications: Regular email newsletters to students, faculty, and staff can provide updates on important events, deadlines, and college news.

Emergency notification system: An alert system for disseminating critical information during emergencies or campus-wide incidents.

Mobile apps: A mobile application that provides on-the-go access to campus information, including events, directories, and academic resources.

Publications: Physical or digital publications such as brochures, catalogs, and annual reports that provide detailed information about the college's programs, achievements, and activities.

Blogs and newsletters: college may manage regularly updated blogs and newsletters that offer insights into academic research, projects, and student achievements.

The effectiveness of a public information system lies in its ability to provide accurate, up-to-date, and relevant information to its target audience. It helps promote transparency, engagement, and a positive image for the engineering college. Regular updates, responsive communication channels, and user-friendly interfaces are essential to ensure the system meets its goals.

3.1.7 Institutional and professional networking

Institutional and professional networking is essential activity for an engineering college to stay connected with other educational institutions, industry partners, professional organizations, and the broader engineering community. Major types of the institutional and professional networking for an engineering college can be listed as below.

Academic partnerships: engineering college/school/campus shall develop the relationships with other universities, colleges for collaborative programs, research initiatives, and student exchange programs. Furthermore, Colleges could establish the relations for sharing resources such as special laboratories, prominent faculties etc.

Industry partnerships: student internships, research collaboration and other programs for mutual benefits can be managed with the industries by signing, MoUs and agreements. Similarly, research and development collaboration with industry partners can be performed on research projects, technology development, and innovation.

Professional organizations: colleges can develop the relationship with the professional societies or organizations for faculty engagement in their respective professional activities such as workshops, seminar and conferences. It can be managed by encouraging the faculty members to join and actively participate in professional engineering organizations.

Alumni engagement: colleges can greatly take the benefits from the alumni associations by creating and maintaining the various forms of collaborations, which would foster the lifelong connections with former students. It would be beneficial to establish a continuing educational/professional division, especially to upgrade the knowledge and skill of the members of the alumni association.

Community outreach: it is the important to keep the good relationship with local communities through outreach programs, supporting local authorities on the relevant engineering issues, create awareness programs on the various issues of local nature.

International partnerships: engineering colleges and universities around the world to facilitate international student exchanges and collaborative research projects to promote global engineering experiences for students through study abroad programs.

Networking not only enhances the college's reputation but also provides valuable resources, opportunities, and experiences for students and faculty. Effective networking can lead to partnerships, research collaborations, and industry connections that benefit the engineering college's academic and research endeavors.

3.1.8 Scholarships and Financial Support

Scholarship initiatives by engineering colleges play a significant role in supporting students, promoting education, and contributing to social development. The scholarship schemes of the engineering colleges can be elaborated as below.

- **Mandatory scholarships**: these scholarships have been directed by the university or by the authority in the general principles of merits or inclusiveness criteria.
- **Need-based scholarships**: these scholarships are offed to the financial weak students. These scholarships can help make engineering education more accessible to underprivileged students.
- **Diversity scholarships**: these type of scholarships are offered to promote diversity and inclusion in engineering by supporting students from underrepresented backgrounds, including women, minorities, and people with disabilities as well as students from the remote areas.
- **Research Scholarships**: these are offered to the students pursuing research projects by providing funding for research activities, conferences, and publication fees.
- **Entrepreneurship scholarships**: Encourage entrepreneurial spirit by offering scholarships to students with innovative business ideas or start-ups.
- **International student scholarships**: it is mainly offered to attract international students to help with tuition and living expenses for the students from overseas. These scholarship programs are managed as part of the student exchange programs.
- **Alumni-funded Scholarships**: these initiatives encourage alumni to contribute to scholarships that benefit current students. Alumni can set up endowed scholarships or contribute to existing funds.

3.1.9 Institutional Social Responsibility (ISR)

These activities of the college are mainly aimed at the establishing the networking with community for mutual benefits. These activities can be outlined as below:

- **Community development**: college faculty or students can be engaged in community development projects near the college, such as infrastructure development, health camps, and education initiatives for the local community.
- **Skills development**: College may contribute to the local community by providing skill development and vocational training programs for the underprivileged and marginalized communities, helping them acquire employable skills.
- **Environmental initiatives:** it includes the implementation of eco-friendly practices within the college, such as energy-efficient infrastructure, waste reduction, and sustainable landscaping.
- **STEM education for Schools**: College may support science, technology, engineering, and mathematics (STEM) education in local schools by providing resources, expertise, and scholarships to students interested in pursuing STEM fields.
- **Collaborations with NGOs**: college may work in partnership with non-governmental organizations (NGOs) to address various social issues, including healthcare, education, and women's empowerment.
- **Healthcare initiatives**: college may set up healthcare clinics, organize health camps, or support medical facilities in underserved areas.
- **Technical workshops and outreach Programs**: it is desirable to organize technical workshops, seminars, and outreach programs to share knowledge and expertise with the local community.
- **Sustainable practices**: college may organize various activities related to the environmentally sustainable practices, such as waste reduction, water conservation, and green campus initiatives.

Both scholarships and ISR activities by engineering colleges contribute to the betterment of society and foster a positive image of the institution. These initiatives not only benefit students but also help the college establish itself as a responsible and socially conscious organization.

3.1.10 Institutional best practices

Engineering colleges could be a key platform for the innovation, development, patenting, and marketing of any industrial commodity. The faculty members as well as students could excellently perform any industry-sponsored research projects. The innovation in any fields of

the engineering can be initiated from the dedication of young minds. Further, development and patent as well as marketing can be followed by the immense support from the industries. This background could be an effective way of marketing for their branding in terms of specific field of engineering education. These leadership qualities can be considered as indicator for the quality of engineering education. Academic institutions could develop their specific field of expertize and these may be include the following aspects as:

- **Leadership in innovation:** Engineering colleges are hubs of innovation. Faculty and students are often engaged in research and development projects that lead to innovative solutions, technologies, and products relevant to the market needs.
- **Leadership in research and Development**: Academic institutions could focus for the research and development activities required for the industrial development fcontributing to the national economy.
- **Leadership in industrial collaboration**: academic institutions could have great support from the collaboration in doing regular academic as well as industrial research and development for their financial sustainability.
- **Leadership in quality education:** Academic Institutions could be develop their identity for the quality of education.
- **Leadership in specific field of engineering**: Academic institutions could be more focused on the some specific engineering programs as per their available resources and specific locations.

Marketing and branding are directly related for the promotion of each business. Therefore, academic institutions could lead the nation for making the educational hub for foreign national. When engineering colleges seek to commercialize their innovations they need to collaborate with industry partners, and marketing efforts are essential to reach potential partners, investors, or customers.

Moreover, some engineering colleges may establish incubators or technology parks to foster innovation, provide resources, and support to startups based on innovations developed within the college. These initiatives may involve mentoring, business development, and marketing activities to help bring college-generated innovations to the market.

This indicator is assessed by the monitoring team on the basiss of documentation and objective evaluation of the evidences and supportive mechanism towards the leadership.

3.2 CURRICULUM MANAGEMENT AND TEACHING LEARNING PROCESS

This criterion is related to the management aspects of the curriculum implementation and overall outcomes of the academic program by the respective institution. The Curriculum formulation is

the responsibilities of the university; the college could give some feedback on those aspects only. Furthermore, the outcomes of the teaching learning process are linked with the overall students' performance. Therefore, this criterion has been explained by two sub-criteria as: institutional outputs and students' performances outcomes. The following indicators mainly characterize teaching learning process for engineering education:

- **Curriculum structure:** The framework for engineering colleges for the four-year Bachelor degree course mainly consists of the basic science and mathematics, core engineering, professional and other group of courses. The content and focus may vary as per the University.
- **Course groups**: The breakdown of the formal contact hours for 27 to 34 hours/week within 36 to 40 working hours/week is given below. The tentative weights of the group of the subjects in the engineering programs is given as:

Table 2: Course structure for undergraduate programs

S/N	Group of courses	weightage
1	Language, Humanities and Management	5 to 10%
2	Basic Science (General)	15 to 25%
3	Engineering Sciences and Technical disciplines	15 to 25%
4	Professional (specific discipline based)	45 to 65 %
5	Open electives belonging to (d) above	about 10%

- **Weekly work schedule**: the course or subjects in the academic programs are mainly conducted as lectures, tutorials and practical. There is the possibility of students' choice for taking the subject of interest as elective courses among the predefined by the university in the specific year of the course duration. The basic course load in terms of lecture, tutorial and practical is given in the syllabus.

Table 3: Weekly working hours for undergraduate programs

S/N	Allocated	Hours
1	Institutional working hours	36 to 40
2	Students' contact hours in formal learning	27 to 34
5	Guidance, counselling and seminars	6 to 9

- **Minimum working days in a Semester**: In a semester system, there should be a minimum of 90 working days out of which 72 days should be made available for classroom instructional days per semester. In a yearly system, the minimum should be 144 instructional days per year. This excludes Examination, and other academic as well as extracurricular activities etc.

- **Minimum students' attendance**: The classes shall be conducted minimum for 72 days in a semester to hold the semester-examination. The concerned university or examination authority shall maintain this requirement. The college should ensure that student attendance requirement shall be maintained more than 80% in the semester for each subject. In case of practical and laboratory classes, student must be present in all laboratory or practical classes. Academic Department is responsible to manage the compulsory requirement of attendance in the laboratory or practical works. Records of each laboratory or practical works shall be maintained and students shall submit the all the laboratory report to the respective laboratories. The concerned department is responsible for maintaining student attendance and conducting the required number of classes in the semester. The Principal of the college should ensure the attendance requirements.

- Workload for faculty: Teachers of engineering institutions have to perform a variety of tasks which include formal instruction in class rooms, tutorial classes, laboratories and workshops, preparation for instruction, assessment and evaluation of student works, counseling and guidance of students as well as research and development activities. Each institution has to deploy personnel and allocate work by considering the institutional goals and objectives and meeting as far as possible individual competency, preferences and interests. The breakdown of workloads specified below has, therefore to be treated as standard guidelines.

Table 4: Working hours for faculty members

S/N	Activity	Average working Hours per Week	
		HOD	Other Faculty
1	Contact Hours (Lectures, Tutorials and Practical)	12	22
2	Preparation, Assessment, Evaluation	6	10
3	Administration, Research, Guidance and Counseling, Development Activities, etc.	18-22	4-8
Total		**36 – 40**	**36 – 40**

3.2.1 Institutional outputs for improved quality of teaching

Institutional management for the quality education are considered in this criteria. The quality of academic institutions depends on the institutional efforts for the effective management of curriculum of the specific program. This aspect is related to the various arrangements for the implementation of curriculum. It includes the lecture classes, laboratory or practical and other project related activities to the specific engineering programs. This criterion is evaluated by considering the following aspects of the institutional outputs for the better results in the student performance.

a) Routine and Course File Management

Head of Department (HoD) or departmental in-charge of the specific engineering programs is responsible for the managing courses. Preparing the class routine and implementing it as per the course curriculum is challenging in the context of limited resources. HODs of the respective programs should maintain systematic course files, containing the relevant information on the courses to be conducted in the semester. It shall mention the breakdown of course content, action plan for course implementation and records of each activity carried out for the proper performance and monitoring of the teaching-learning activities.

Institution shall manage the tutorial classes as per the curriculum. The maximum number of students in each tutorial class shall not exceed 30. The objective of conducting the tutorial class is to facilitate the students to carry out course/project works and design problems, which require more support from the teachers. Furthermore, in the tutorial class, students are encouraged for presentation with interaction among them.

b) Management of Laboratory/practical works

Institution should make timely arrangement of the requirements on the resources for effective implementation of academic calendar. Institution should plan before the start of the semester and confirm the availability of required laboratory equipment and consumables for maintaining the routines for laboratory and practical works. HoD is responsible for the fulfilment of minimum contact hours (as per the syllabus) in terms of lecture, tutorial and practical. Furthermore, the semester duration and the required course credits shall be maintained. Similarly, the respective course teacher or HoD shall closely monitor students' attendance requirements. The students' attendance in the laboratory works shall be made mandatory for each course. The effective implementation of laboratory works college/institution shall perform the following activities:

- Monitor and manage the requirement of adequate laboratory spaces and routines as per the syllabus, human resource allocation, provision for adequate equipment and effectively conducting the practical works.
- Laboratory space shall have the well managed instructional materials with posters as well as manuals and suitable kind of display systems.
- Safety rules for each laboratory shall be in place and be explained to the students before each practical class.
- Budget allocation: Institution should ensure the adequacy of the need-based annual budget for laboratory/workshop consumables to the respective HODs.

- Laboratory class records: Respective HODs should ensure the proper sequence of laboratory experiments. Verifiable records should be available with regard to conducted practical with details like by whom, when and to whom.

c) Teachers' orientation seminars/trainings/workshops

Teachers are main role models for the students. Therefore, teacher shall be careful in their profession and always demonstrate the competency to convince the classroom on the subject matter. Furthermore, teachers shall have good teaching skills as well as attitude. These qualities could be gained in the various training programs for teachers. Therefore, teachers' training programs shall regularly be organized to upgrade skill and impart the knowledge on teaching methodology and skills. Furthermore, these training programs shall contain the following aspects:

- Orientation programs for newly appointed faculty members and staff,
- Curriculum management (including class-routine) seminar for each semester shall be conducted for faculty members,
- Pedagogical and subject specific trainings shall be managed for faculties,

d) Examinations/internal assessment

Students' performance for engineering courses is evaluated continuously during the semester and at the final stage of the semester. The continuous students' assessment shall be well planned for each course. All the assessments shall be planned in the academic calendar and should be implemented as per the predefined schedule. Most importantly, students' evaluation in the laboratory works shall be performed in terms of practical work report, viva-voce or written examination. Institution or respective department shall make the schedule of the internal evaluation for each subjects including project/laboratory/practical works. These schedules of assessment shall be maintained and records should be properly kept in the Department or the in the Examination Unit. The external examiner can be invited for the evaluation of project works or other specific subjects.

e) Students' project works, Assignment and continuous evaluation

Generally, she students' project works are performed in a group. The group formation and project work allocations is the responsibility of the Department. The supervisors shall regularly monitor project work progress. These progress records and report shall be submitted to the HoD or project-work in-charge. It is desirable that the final evaluation of the project work shall be arranged by the involvement of the external examiner.

f) Industry interaction

Institution shall organize the seminar/workshop/site observation as per the course of studies. However, college may organize such events on the relevant issues to the engineering sector.

Interactions between engineering students and the industry are crucial for several reasons. The interactions help students gain real-world insights, bridge the gap between academic knowledge and practical application, and prepare for their future careers.

HODs shall made the plan for the industry interactions during the semester. These interactions may be arranged in the form of the teaching learnings activities as:

- **Seminars**: Seminars can be conducted with the involvement of the professional from the industry. It makes students familiar to the real world issues in the specific subject. Furthermore, it may create the professional networking for future internship and other research and project works. These programs allow students to correlate the classroom knowledge with the real industrial issues of the respective subject.
- **Workshop and hands-on trainings**: these shall be organized to impart the knowledge or hands-on skill on the study matter. These training shall be managed in collaboration with the relevant industries to the engineering programs.
- **Project site observations**: industry tours shall be organized to visits to industrial facilities, factories, and research centers, giving students a firsthand look at industrial processes and operations.

These study tours or site observations shall be conducted as the case studies or project works. It is desirable to prepare the study report in a group of students. In some cases, field study/project site observation report should be followed by the presentation.

g) Internship

An internship is a temporary work placement organized by the academic institutions. It may be organized for the period of a few weeks or over the months. It may be managed during the long vacations between semesters. Internship has been included in most of the University courses mainly in the final year/semester. Besides the regular course of internship, colleges are encouraged to organize the additional internship for the students to make them familiar with the industrial or professional environment.

h) Guest lectures

Guest lecturers in engineering colleges are typically by experts or professionals from various industries who are invited to deliver lectures, workshops, or presentations on specific topics related to engineering and technology. These individuals can provide valuable insights, real-world experience, and industry perspectives to students, enhancing the learning experience. It is desirable to plan the guest lectures by indicating the day of the week in the academic calendar

for its effective implementation. These could be organized by professionals from the relevant industries or professional societies.

i) Student enrollment

Student enrollment in an academic institution has significant impact on the quality of education and the overall student performance. The relationship between enrollment numbers and quality can vary depending on several factors, including the resources available, faculty-to-student ratio, infrastructure, and the college management. When college shows better performance records, it becomes popular among potential students. Therefore, student enrollment with respect to the approved capacity of the engineering program is taken as the criterion for the quality of the college. Furthermore, the enrollment trend of the engineering programs creates the basis for the sustainability of the institution due to the financial resource collected as the fee from the students. The justification for these criteria can be described as below:

Students observe the existing resources and Infrastructure of the colleges before the admission better the infrastructure and resources more the number of students to come for enrollment. The first impression of the existing infrastructure and physical resources attract more students.

In addition to these aspects, student enrollment is also increased by the fee structure as well as the scholarship schemes of the colleges. In conclusion, student enrollment is derived by the overall college performance related to the management of physical resources and the student welfare systems.

j) Sponsorship for capacity development for faculty

College shall have well defined and documented policy for the faculty development, endorsed by the apex body of institution. In this indicator, institutional arrangement/support for upgrading the qualification of the faculty such as formal academic programs, and other non-credit or informal academic programs to enhance the individual capacity of the faculty is considered for the assessment during the monitoring.

This support may vary in the range of various capacity building programs for the faculty members such as specific trainings, participation of international/national conferences and other events.

3.2.2 Student Performance Outcomes

Student performance outcomes refer to the expected results and achievements of students pursuing engineering programs. These outcomes are typically defined by educational institutions and accreditation bodies to ensure that students acquire the knowledge, skills, and competencies needed for success in the engineering profession. Here are some common engineering student performance outcomes as described below:

a) Student pass-rate

The students' pass rate is one of the major indicators of the student performance at the university education system. Students should demonstrate a deep understanding of fundamental engineering principles and the ability to apply this knowledge to solve engineering problems. This includes proficiency in mathematics, science, and engineering analysis. These aspects are important for demonstrating the student performance and is related to the student pass rate in the examinations. The student pass-rate in the different semesters and final examinations vary due to the difficulties of the subject matters, and number of courses in the semester.

NEC reviews the exam records of the colleges in terms of the final year pass rates during the monitoring. This rate directly indicates the quality of teaching-learning efforts of the colleges, i.e. higher the pass rate better the performance.

b) Student Exposure

Students' participation in national and international conferences provides opportunities to enhance knowledge, networking with professionals, and gain valuable experience. The benefits of the students' exposure to such events are manifold such as:

- **Learning opportunities**: Conferences and events offer a platform to learn about the latest developments, trends, and research in the field of engineering. Students can attend presentations, workshops, and technical sessions to gain new knowledge and insights.
- **Networking:** These gatherings provide a unique opportunity to connect with professionals, researchers, and fellow students. Networking can lead to valuable contacts for future career opportunities, internships, and collaborations
- **Presentation skills**: Many conferences allow students to present their research, projects, or papers. This enhances their presentation and communication skills, which are valuable in academia and industry.
- **Exposure to diverse perspectives**: International conferences often feature participants from around the world, exposing students to diverse viewpoints and approaches to engineering challenges,
- **Career development**: Conferences and events can be a pathway to career development. Students can learn about job opportunities, career paths, and industry expectations directly from professionals in the field.

c) Students' Publications

Student publications refer to works created and published by students, often in educational or academic settings. These publications can take various forms, including research papers, journals, magazines, newsletters, blogs, and more. They offer students an opportunity to share their ideas, research, and creative work with a broader audience. It develops the creativity and writing as well study culture among students. Furthermore, such activities facilitate the students to work in the team as well as to promote the leading capacity to the students. Major types of students' publications can be considered as below:

- **Student Journals**: These are academic journals or publications that highlight research papers, articles, essays, and other scholarly works authored by students. They may cover various academic disciplines and are often peer-reviewed by faculty or experts in the field.
- **Student newsletters**: Student can publish newspapers that report on campus news, events, and issues of interest to the student body. These newspapers can provide valuable journalism experience.
- **Magazines and literary journals**: These publications feature creative writing, poetry, short stories, and artwork created by students. They can cover a wide range of literary and artistic genres.
- **Blogs and online platforms**: Some students choose to create their own blogs or websites to share their thoughts, research, and experiences with a global online audience. These platforms can be informal or focused on specific subjects.
- **Research conferences and symposiums**: Students often present their research findings at academic conferences and symposiums, with the possibility of later publishing their work in conference proceedings or academic journals.
- **Student association publications**: Many student organizations and associations produce newsletters or magazines to communicate with their members, highlight their activities, and share relevant information.
- **Yearbooks**: Yearbooks are common in high schools and universities, serving as historical records of student life and events during a particular academic year. They often include photos, stories, and student contributions.

d) Inter/Intra college events

Inter-college events, such as exhibitions and project competitions, are a great way for engineering students to exhibit their skills, creativity, and innovative projects. These events offer opportunities for students to collaborate, learn from each other, and gain practical experience.

These events are initiated from the intra and intra college activities in the field of interest. Some common types of inter college events related to exhibitions and project competition are as:

- **Engineering exhibitions**: Engineering exhibitions are events where students display their engineering projects, prototypes, and innovations. These are mainly wide range of engineering projects, from various fields of engineering including robotics, civil engineering design solutions, software, and others.
- **Capstone project exhibitions**: Many engineering programs require students to complete a capstone project as a culmination of their studies. These showcases provide a platform for students to present their capstone projects to faculty, peers, and sometimes industry professionals.
- **Innovation and design competitions**: These competitions challenge students to create innovative solutions to specific problems or design challenges. The projects can cover a broad spectrum of engineering fields, from mechanical and civil engineering to software development and electronics.
- **Hackathons**: Hackathons are intense, time-bound events where students collaborate to develop software applications or solutions to particular challenges. These competitions emphasize coding, problem solving, and creativity.
- **Robotic competitions**: Engineering students frequently participate in robotic competitions, such as robot design and battle competitions. These events encourage students to apply their engineering and programming skills to create functional robots.
- **Sustainable design challenges**: These challenges focus on environmentally friendly engineering solutions. Students work on projects related to renewable energy, waste reduction, and sustainable infrastructure.
- **Technical paper and poster presentations**: In addition to physical project displays, students may present technical papers and posters explaining their projects and findings. This allows for in-depth discussions and knowledge sharing.

Participating in these events not only allows students to demonstrate their technical skills and creativity but also enhances their ability to communicate their ideas effectively. It fosters teamwork, problem solving, and project management skills, which are valuable for their future careers in engineering. Additionally, it provides students with the opportunity to receive constructive feedback and recognition for their hard work and dedication.

3.3 RESEARCH, KNOWLEDGE GENERATION AND EXTENSION

Research, knowledge generation, and extension in engineering are essential components of academic institutions that promote the advancement of knowledge, technological innovation, and the development of engineering education. The faculty members guide students' academic research. Similarly, research can be arranged among faculty members within the same college or as the collaborations among faculties from other institutions. It is desirable to create the continuous mechanism for the collaborative or sponsored research projects with the industries.

Research, knowledge generation, and extension activities at engineering colleges contribute to the growth of the engineering field, the development of new technologies, and the enhancement of engineering education. They also elevate the reputation of the college, attract top talent, and facilitate research collaborations that advance science and technology. Major indicators for the monitoring the colleges in these criteria are mentioned below.

3.3.1 Research Budget and Plans

Institutional set up and funding is an initial and fundamental step for the promotion of research in the academic institutions. The college shall establish the Research Management Unit (RMU) by the decision of the management board with the dedicated funding policies and guidelines.

Securing research funding is crucial for the success and sustainability of research activities in an engineering college. Funding can support faculty, researchers, and students in conducting innovative research projects. College shall allocate the certain percentage of the operational expenditure for R & D activities. College shall develop strategy for research funding, which may be as below:

- **Identify funding sources:** there are various funding sources available for engineering research. These can include government agencies, private foundations, industry partnerships, and University Grants Commission, National Academy of Science and Technology, professional societies, and other international funding agencies.
- **Grant proposal development:** the RMU shall develop a well-structured grant proposal for each funding opportunity. These proposals may differ as per the funding agencies.
- **Faculty training and support:** RMU shall provide training and workshops to faculty members on grant writing, budgeting, and proposal development.
- **Collaborations and partnerships:** the research collaboration with other academic institutions, research organizations, and industry partners also may support the funding for research activities. Many funding agencies prefer projects that involve multiple stakeholders.

- **Government grants:** Sectoral government agencies often initiate the research projects in collaboration with the academic institutions. RMU or college shall develop networking or perform the Memorandum of Understanding (MoU) with those agencies for the funding support on mutual benefit.
- **Industry partnerships:** Engineering College could develop research projects with related industries for mutual benefits. This will be the sustainable source of research funding. The outcomes from such research shall be useful for the real world application and patent claiming initiatives.

It is necessary to understand that securing research funding can be competitive and may require multiple attempts. The multiple attempts make improvements in the proposals, which will be the way for the perfection in the research grant competitions.

Establishing a culture of research funding acquisition in the engineering college requires commitment, collaboration, and a systematic approach to identifying and securing funding opportunities. With a dedicated effort and effective grant proposal development, college can increase the possibility of obtaining research funding.

3.3.2 Functional Research Management Unit

Establishing a Research Management Unit (RMU) in an engineering college shall be taken as the strategic initiative to promote and manage research activities effectively. This unit plays a crucial role in fostering research culture, improving research outcomes, and enhancing the college's reputation in the academic and research community. RMU establishment can be elaborated in the following steps:

- **Needs Assessment**: the executive body (management board) shall identify the need and goals of establishing the RMU. It shall determine the objectives, expected outcomes, and the specific areas of research focus, funding as well as sustainability approaches.
- **Formulation of a committee**: a committee consisting of experienced faculty members, researchers, and administrators shall be formed to oversee the activities of the RMU. This committee will be responsible for planning and implementation.
- **Resource allocation**: the college shall allocate budget and resources for the RMU, including office space, staff, equipment, and software and other logistics depending upon the research implementation.
- **Organizational structure and staffing**: RMU shall be mentioned in the organizational structure of the college, including roles and responsibilities of the in-charge. There shall be provision for the support staff.

- **Infrastructure and Facilities**: the college shall ensure that the RMU has access to necessary research facilities, laboratories, and equipment to support research activities.
- **Research policies and guidelines**: there shall be well defined research policies, guidelines, and procedures for faculty and researchers. This should include guidelines for grant applications, ethical considerations, and intellectual property rights.
- **Research promotion and funding**: the financial mechanisms for promoting research, including hosting seminars, workshops, and conferences shall be managed as mentioned in the annual budget of the college. The funding may be arranged in collaboration with the government agencies, industry, and philanthropic organizations.
- **Ethical review and compliance**: the RMU shall prepare the mechanism for the assurance of the research ethics to ensure that research conducted in the college adheres to ethical standards and complies with regulatory requirements.
- **Collaboration and networking**: the college shall encourage collaboration with other research institutions, universities, and industry. Establish research partnerships and networks to enhance research opportunities.
- **Knowledge dissemination**: the RMU shall promote the dissemination of research findings through publications, conferences, and other knowledge-sharing platforms.
- **Monitoring and evaluation**: the RMU shall establish key performance indicators (KPIs) to monitor the unit's performance and evaluate its impact on research activities within the college.
- **Training and capacity building**: the RMU shall conduct the trainings and support for faculty and researchers to enhance their research skills, grant-writing abilities, and research proposal development.
- **Annual reports**: Prepare and publish annual reports on the RMU's activities, achievements, and plans. Share these reports with college leadership and stakeholders.

Establishing a Research Management Unit is a long-term commitment to building a strong research ecosystem within the engineering college. It should aim to support and encourage faculty and researchers in their pursuit of cutting-edge research and innovation.

Research activities are mainly focused on the student involvement with the supervision of the faculty members. These activities are essential for advancing knowledge, fostering innovation, and preparing students for the challenges of the engineering profession. Some examples of the academic research activities are listed as below:

- **Faculty-led research:** Faculty members of the colleges often lead research projects in their respective fields of expertise. This can include basic research, applied research, and interdisciplinary research in specific engineering field.
- **Student research projects**: it is the students' involvement in research projects under the guidance of faculty members. These projects provide students with hands-on research experience.
- **Interdisciplinary research**: it is the collaboration across different engineering disciplines and with other departments to address complex real-world problems. Interdisciplinary research can lead to innovative solutions.
- **Research symposia and conferences**: the academic research can be disseminated by the organizing and participating in research symposia and conferences, which provide opportunities for knowledge exchange and networking with experts in the field.

Academic research activities in an engineering college are instrumental in advancing knowledge, driving innovation, and preparing students for successful careers in the engineering profession. These activities contribute to the growth and reputation of the college and the broader engineering community.

3.3.3 Functional Consulting Division

Establishing a Consulting Division (CD) in an engineering college involves several steps and considerations. General outline for the establishment and operation are as below:

- **Needs assessment and establishment**: Before establishing a consulting division, assess the needs and demands of both the students and the local community or industry. What type of consulting services are required? This could range from engineering design, project management, or technical expertise. The governing body (Management board) shall approve the establishment.
- **Budget and funding**: Determining the budget required for setting up the division is important step. It needs for infrastructure, equipment, staff salaries, and marketing. The funding sources could be grants, donations, or partnerships with local businesses and own capital investment.
- **Infrastructure**: Ensuring the scale of the division, necessary infrastructure, including office space, meeting rooms, and any specialized equipment or software are required to build or procure for consulting work.
- **Staffing:** Hiring the qualified and experienced professionals to lead and staff the division. Professors, industry experts, and experienced alumni can be good candidates for this position.

- **Legal and regulatory compliance**: the compliances with all legal and regulatory requirements for setting up a consulting division shall be performed. This might involve registering as a business entity, obtaining licenses, and adhering to academic or industry standards.
- **Services offered:** CD shall clearly define the typs and scope of the CD. This could include engineering design, feasibility studies, technical training, and more.
- **Marketing and outreach:** CD shall be promoted within the college and to the broader community. This could involve creating a website, marketing materials, and establishing connections with local businesses and industries.
- **Project management**: Developing a system for project management, including client engagement, project proposal, execution, and evaluation is an essential part of the CD establishment and operation.
- **Quality assurance**: Implementing a quality assurance process to ensure the consulting services meet industry standards and client expectations is an important procedure for the organizational reputation and for marketing.
- **Documentation and reporting**: CD shall maintain the records of projects, client feedback, and outcomes.
- **Evaluation and Improvement**: there should be continuously assessment of the CD's performance and feedback from clients and stakeholders to make improvements.
- **Collaboration:** CD shall initiate consideration for partnerships with other departments within the college, other educational institutions, and industry organizations to enhance the consulting division's capabilities and reach.

CD operation may be specific and requirements can vary based on the college's location, resources, and goals.

Income-generating consulting services in the engineering colleges is a valuable way for these institutions to leverage their expertise, faculty, and resources to generate revenue while providing services to external clients. The areas of the consulting service for income-generation can be taken as below:

- **Engineering consultancy services:** Engineering colleges can offer consultation services to external organizations, including businesses, government agencies, and non-profit organizations. These services can cover a wide range of engineering disciplines, such as civil engineering, electrical engineering, mechanical engineering, and more. These services may include technical solutions to the specific engineering

problem, offering expertise on specific projects, conducting research, or providing recommendations for process improvement.

- **Research and development projects:** Engineering colleges having the innovative research facilities and wealth of technical knowledge. They can engage in research and development projects for external clients, including industry partners. These projects can lead to the development of new technologies, products, or solutions and the college can benefit from licensing agreements, royalties, or project funding.
- **Expert services:** These services are special in nature with the inputs from the professionals and experts in the specific field of interest. This might include short courses, professional development programs, or certification training, leading the team of experts to resolve specific issues related to the public concern. These programs can generate income while enhancing the skills and knowledge of industry professionals and public authorities.
- **Testing and certification services:** colleges with advanced testing and certification facilities can provide testing and validation services to external clients. This is particularly common in fields such as materials science, electronics, and environmental engineering. Certification services can include quality assurance, safety testing, and compliance with industry standards.
- **Software and simulation services**: Engineering colleges with expertise in software development and simulation can offer software solutions, modeling, and simulation services to external organizations. These services can be used in various industries, including hydropower, construction industries, automotive, and healthcare.

To implement income-generating consulting services effectively, engineering colleges typically establish dedicated offices or departments focused on industry engagement, technology transfer, and commercialization. These offices facilitate collaboration, contract negotiations, and project management between the college and external clients. They also help ensure that the consulting services provided align with the college's expertise and objectives.

Income-generating consulting can benefit engineering colleges by diversifying revenue streams, fostering partnerships with industry, enhancing the college's reputation, and providing opportunities for faculty and students to work on real-world projects.

3.3.4 Sponsored Research

Sponsored research in engineering colleges refers to research projects, studies, or investigations that are funded and supported by external organizations, such as government agencies, industry partners, non-profit foundations, professional societies or other research institutions. These external entities provide financial resources, equipment, expertise, and other

forms of support to the engineering colleges or researchers to conduct specific research projects.

Sponsored research typically involves a formal agreement or contract between the external organization and the engineering college, outlining the scope of the research, funding terms, deliverables, and intellectual property rights. Sponsored research has several benefits for both the sponsoring organizations and the engineering colleges:

- **Funding:** Sponsored research provides much-needed funding for engineering colleges to carry out research projects, hire research personnel, purchase equipment, and cover other research-related expenses.
- **Collaboration:** It promotes collaboration between academia and industry or government agencies, fostering a mutually beneficial relationship. Engineering colleges can work closely with organizations to address real-world problems and share expertise.
- **Skill development:** Sponsored research projects often require students and faculty to develop and apply advanced skills and knowledge, which can enhance their educational experience and professional development.
- **Innovation:** Sponsored research can lead to the development of innovative technologies, solutions, and products that can have a significant impact on various industries and society as a whole.
- **Intellectual property and patents**: In some cases, the results of sponsored research may lead to the creation of intellectual property, such as patents, which can provide licensing and commercialization opportunities for the college and its researchers.

Overall, sponsored research is a crucial aspect of the academic and research activities of engineering colleges, as it drives innovation, addresses real-world challenges, and strengthens ties between academia and industry or government entities.

3.3.5 Organizing conferences

Engineering colleges are engaged in the research and other outreach engineering activities. These initiatives could create better background for the knowledge generation and dissemination to the society and engineering communities. These could be carried out by organizing conferences (International or National) Seminars, workshops and other form of the communications platforms.

Master's level programs are strongly recommended to organize the graduate conferences for their research carried out during the Mater's level thesis.

3.3.6 Publication of Journals

Colleges are encouraged to publish their research results and other project outcomes. The publication of scientific journals could be a ultimate goal for the academic institutions. It could be managed by collaborating with other professional societies and scientific publishers in the various field of engineering and technology. These publications may be in the form of Conference Proceedings and periodicals of other research activities.

3.4 PHYSICAL RESOURCES

Physical resources play a vital role in the effective functioning and success of engineering colleges. These resources are essential for providing a conducive environment for teaching, research, and innovation. Investing in and maintaining these resources are essential to ensuring the success and competitiveness of engineering colleges in the rapidly evolving field of engineering and technology. The indicators for supporting the importance of the physical resources are described below:

3.4.1 Land area requirement

Availability land of an academic institution is an important and primary requirement for the establishment of an academic institution. The requirement of the land area shall be fixed for construction of the administrative, academic, laboratory, workshops, library buildings and other support facilities. The land management and the type of the construction of the buildings (multi-storey or the use of basements) shall fulfill the prevailing building bylaws. Furthermore, the land requirements and building types may differ as per the climatic region or settlement type. Furthermore, the land shall be managed or acquired to meet the future extension for the academic programs as well as allied activities. NEC has fixed the various alternative land requirements by considering the effective and efficient space management for academic and supporting activities. Land requirement alternatives are taken as below.

a) Minimum land requirement: the land area shall be minimum of 15.0 Ropani (about 7,632 sq. m.) for a College/Campus having students.
b) It is desirable that the land ownership should be in the name of the College/institute.
c) It is desirable that the same academic programs shall be located at one place.
d) College/Campus shall get approval of change of the location/address from the University and get it endorsed after monitoring from the NEC.

3.4.2 Buildings and space requirement

The minimum requirement of space and buildings shall be fixed on the basis of the intended purpose, and number of programs. Furthermore, the desired norms could be increased for more comfort and future extension of the academic programs. All the extensions and future

development plans shall encompass the perspective and demand in the specific area of engineering field.

The College premises for conducting Engineering programs shall be separated from non-engineering programs. The floor space requirement of the buildings for the college is as:

- The desirable carpet area in the Campus shall not be less than 6.0 sq. m. per student.

College/Campus area for an engineering institution can be classified as:

- Academic block/annex: Academic area shall include classrooms, tutorial rooms, drawing halls, laboratories, workshops, computer center, library, instructional resource center, conference hall, etc.
- Administrative block/annex: this area comprises of Principal's room, visitors lounge, staff/teachers' rooms, college office, departmental offices, stores, etc.
- College amenities/facilities: Area for amenities consists of common rooms, recreation center, hobby center, gymnasium and alumni association, shops/stationery, health clinic, parking, Canteen, etc.
- Residential block/annex: Residential area includes student hostels, staff quarters and guesthouses.

3.4.3 Engineering laboratories and management

Laboratories including workshops in engineering colleges are essential for hands-on learning and practical skills development. These facilities provide students with opportunities to apply theoretical knowledge in a real-world context. The type and numbers vary as per the University course curriculum of the program. Therefore, these laboratories shall be well equipped and maintained to carry out specific subject related practical.

Laboratories for engineering discipline are crucial for teaching and practical as well as the skill development in the relevant subjects. Some of the laboratories are for individual student work, group work and some of them are for only demonstration. The laboratories shall have sufficient and proper functioning equipment. The college shall properly maintain laboratory equipment and each practical works shall be provided with the manual or guide for supporting the students with step-by-step procedure. Students shall be made aware of health and safety rules before start of each practical work.

The college shall prepare and maintain the checklist of practical works and related laboratory equipment for each semester of each academic program. The responsible person (Lab in charge) for laboratories for each engineering program shall be appointed with the adequate qualification and experiences.

Availability of properly maintained general and discipline-specific laboratories for conducting academic programs shall be ensured based on the syllabus of the engineering program. The monitoring team in sampling basis can physically verify these requirements. The field inspection of the laboratories is carried out as follows:

- Responsible personnel: The laboratory head (in charge) is responsible to maintain the checklist including item of practical works and equipment of laboratories for each semester in every engineering programs,
- The lab-inspection is carried out jointly with the Laboratory in charge,
- Checklist of each practical works: The checklist is confirmed with the syllabus for each programs. The confirmation on checklist can be concluded as:
- The results on the verification are noted as:
    - All laboratories (as per the course syllabus) are available and properly maintained,
    - Laboratories (as per the course syllabus) are partially available and moderately maintained,
    - Laboratories (as per the course syllabus) are partially available and poorly maintained

3.4.4 Carpet area for administrative and allied facilities

The space for the administrative and allied facilities are those, which are not directly used for the academic purposes. However, these facilities are creating conducive environment for academic institutions. The minimum and desirable norms for the carpet areas for different administrative offices of the college are shown in the table below.

Table 5: Carpet area of the administrative and allied facilities

S/N	Particulars	Space (carpet area) requirement, sq. m.
1	Principles Office with meeting room	20-30
2	Reception desk with lounge	10-20
3	Head of Department (per department)	10-15
4	Professor/and faculty members (per person in the cabin) or combined for multiple faculties	5 -10
5	Departmental administrative Office (per department)	10-15
6	Examination Office	15- 20

S/N	Particulars	Space (carpet area) requirement, sq. m.
7	Conference hall (Proper arrangement of seats, lights, curtains, ventilation, front dais, multi-media with sound system)	50-75

3.4.5 Standard operating procedures

Standard Operating Procedures (SOPs) in engineering colleges typically includes a wide range of processes and guidelines that help maintain the institution's efficiency and safe operation. The SOPs are related to the physical resources and shall be focused on the effective functioning as well as proper utilization of resources. There are some common areas, where SOPs shall be prepared and maintained:

- Laboratory Safety Procedures: It shall include the methods and procedure of handling of the laboratory equipment, chemicals and emergency cases.
- Facilities Management: These SOPs are prepared for the maintenance and operation of facilities, including guidelines for equipment maintenance, classroom reservations, and campus security and others.
- Research Procedures: Research SOPs might include guidelines for conducting experiments, managing research projects, and ensuring ethical conduct in research.
- Campus Security: Procedures for campus security, such as access control, emergency response, and reporting incidents, are important in maintaining a safe environment.
- Health and Safety: These SOPs focus on maintaining the health and safety of students, faculty, and staff, covering areas such as first aid, fire safety, and hygiene.
- IT and Data Management: Guidelines for managing IT infrastructure, data protection, and network security are crucial in the digital age.

The specific SOPs regarding physical resources and their details may vary among the types of engineering programs and affiliated university. These SOPs are documented and periodically reviewed and updated in the specified format.

3.4.6 Teaching - learning facilities and equipment

Number of Classrooms and space requirements, workshop and laboratory space requirements, laboratory equipment, library space and number of books are major components of the teaching learning facilities.

a. Number of Classrooms

The desired number of contact hours (lecture/tutorial) for engineering subjects shall be about 34 hours per week. The classes shall be managed from Sunday to Friday. The maximum number of student in lecture class should not exceed 48. The tutorial and laboratory classes shall be managed for smaller groups of maximum 24 students in the separate room/laboratory. One teacher is assigned for each tutorial/laboratory group.

For conducting the classes of Engineering Drawing and design assignments, the class can have a maximum number of 24 students. Two teachers shall be assigned for each drawing class.

Around the classrooms and drawing halls, there should be adequate space for movement of students.

- Number of Lecture rooms (NL)

$$\boldsymbol{NL} = (\boldsymbol{TL}/\boldsymbol{SL})\,(\boldsymbol{HL}/\boldsymbol{HW})\,(\mathbf{1}/\boldsymbol{FL})$$

Where

NL = Number of Lecture rooms,

SL= Class size (maximum number of students in the class, i.e. 48)

TL = Total number of students in the college as per the model Class size for all programs (for example, the TL for Civil and Electrical engineering programs is calculated as 384). It does not show the actual number of students admitted in the programs.

HL = Average number of lecture hours per week per class requiring classroom. This number depends upon the structure of the programs and it is about 15 for each engineering programs.

HW = Number of working hours per week. This can be taken as 34 as stated earlier,

FL = Utilization factor of lecture rooms. It is taken from 0.75 to 0.8.

- Number of rooms for Tutorial Classes

The number of rooms required for tutorial work (NT) can be determined by applying the following relationship:

$$\boldsymbol{NT} = (\boldsymbol{TT}/\boldsymbol{ST})\,(\boldsymbol{HT}/\boldsymbol{HW})\,(\mathbf{1}/\boldsymbol{FT})$$

Where

NT= Number of tutorial rooms required

ST= Class size for conducting tutorials (maximum number of students in the class, i.e 24)

TT = Total number of students in the college as per the model Class size for all programs (for example, the TL for Civil and Electrical engineering programs is calculated as 384). It does not show the actual number of students admitted in the programs.

HT= Average number of tutorial hours per week (it is taken as 6.5).

HW = Number of working hours per week which can be taken as 34.

FT= Utilization factor of tutorial rooms. It is taken from 0.75 to 0.8.

- Number of drawing halls

The number of drawing halls (ND) required can be determined as:

$$\boldsymbol{ND = (TD/SD)\,(HD/HW)(1/FD)},$$

Where,

ND= Required number of drawing halls,

SD = Class size for conducting Drawing (maximum number of students in the class, i.e 24)

TD = Total number of students in the college as per the model Class size for all programs (for example, the TL for Civil and Eletrical engineering programs is calculated as 384). It does not show the actual number of students admitted in the programs.

HD = Average number of drawing classes in hours per week (it is taken as 2.75)

HW = Number of working hours per week which can be taken as 34.

FD = Utilization factor of tutorial rooms. It is taken from 0.75 to 0.8.

Total number of classrooms of an engineering college is calculated as below:

N = NL+NT+ND

NL: number of lecture rooms,

NT: Number of tutorial rooms,

ND: number of drawing halls,

The total number Classrooms shall be available as per the class-routine and the Syllabus for particular program. The normal classroom can be used for the purpose of drawing class by providing separate drawing board for each student.

b. Carpet area for Class Rooms

The carpet area requirement of the Lecture and Tutorial rooms depends upon the student numbers and type of seating arrangement as well as the provision of platform, a table and a chair for the teacher.

The drawing hall should be provided with drawing tables and stools for the students. The drawing tables must be arranged with passage so that the teacher can access the drawing table of each student. The drawing halls will also be provided with a platform for the teacher. The basic requirements in the classroom shall be as mentioned below:

- Every corner of the classroom shall be visible from teachers' position,
- Lights shall be properly maintained,

- External sound shall not disturb be classroom ambiance,
- It is desirable to maintain the classroom temperature during the summer or winter,
- Multimedia shall be fixed, ready for use (no loss of time for fitting),
- Seats of bench/chairs shall be comfortable for students,

The recommended carpet area for a room for lecture, tutorial and drawing is given in the table below:

Table 6: Minimum carpet area requirement for classrooms

S. No.	Type of Rooms	Carpet Area requirement in Sq. m./student		Min. area of a sample room
		Minimum	Desirable	
1	Lecture room for 48 students	1.00	1.15	48
2	Tutorial Class room for 24 students	1.15	1.25	28
3	Drawing Hall (24 students)	2.50	2.50	60

Note: If the class size is of 60 students, then the tutorial rooms shall be managed for 30 students.

c. Laboratory/workshop space requirements

The requirement of the laboratories depends upon the programs that are being offered by the institution and the curricula for these programs irrespective of the student population. Experiments that the students have to perform depends on the curriculum and not on the number of students admitted. The requirements on the laboratory space have been taken as follows:

- The college shall build the equipped laboratory as per the requirement of the respective curriculum,
- Laboratory for the project works shall be established and maintained as per the requirement of the specific academic programs.
- The minimum requirement for the laboratory space (carpet area) shall be 2.5 sq. m. per student,
- The total space requirement for workshop (carpet area) shall be 100 sq. m.
- Some of the laboratories may have very small utilization factor. As such, the area required for the laboratories will be independent of the total student's number.
- The store for the survey equipment and other moveable equipment shall be managed separately.

d. Library reading room space

The library of an engineering college requires a reading room, stack room, journals and periodicals room, issue counters, offices and stores.

- The reading room must have minimum accommodation for 10% of the total students.
- Separate space must be available for the display and reference of current periodicals & Journals.
- In addition, an office for the librarian and cataloguing books, a store and issue counter will have to be provided within the library.

e. Library Area

Library space shall be maintained in accordance with the total number of students in the college.

Minimum space for 500 students shall be 200 sq. m. The additional of space is 0.275 sq. m for each additional student.

f. Availability of Books in Library

The minimum requirement on the number of books for each program shall comply with the following:

- The library should have at least one textbook for each subject for all students.
- The library shall have at least 10 reference books for each subject.
- Total number of books for the each program required for entire duration of the four-year course is about 2500.
- Additionally, extra books should be available for the faculty members for each subject.
- It is desirable that the text/reference books should be replaced by new edition publication periodically.

The journals and periodicals shall be available in the library. Minimum two national and one type of international journal shall be available in the series/volumes of the publications. These journals shall be related to each academic programs of engineering.

g. Library Management System

The library operations shall be well managed by the application of Library Management System (LMS). It consists of software modules for Cataloging, Patron Management, Circulation Control, Online Catalogs, Reporting and Analytics, Acquisitions and Budget Management, Digital Content Management, and Security and Access Control. The qualified librarian (the head of the library) shall be recruited for the efficient library operation. The minimum requirement for the library head is mentioned as:

- The desirable qualification for a Librarian is considered as the Bachelor's degree in Library science/Management,
- Alternatively, minimum qualification for librarian can be accepted as the certified library management training programs of minimum duration of three months. Additionally, he/she shall have the academic degree of Bachelor in any discipline.

h. Online access

- An online access to the books, journals and other resources is very aefective for the research and teaching learning activities. Such a digital or internet-based collection of books, journals, articles, and other resources that can be accessed via the web. There are many online libraries available for various purposes. Some of them can be referred as:
- National Library of Nepal (NLP): The National Library of Nepal offers digital resources and catalogs that can be accessed through online.
- Nepal Journals Online (NepJOL): An online platform provides access to a wide range of academic journals and research articles published in Nepal.
- Nepal Library Association (NeLA): NeLA is an organization dedicated to promoting libraries and library services in Nepal. They may provide information on online library resources and services.
- University Central Library Systems: The Central Libraries of various Universities also offer online access to its catalog and resources.
- It is desirable that the college shall have the facility for the online access to promote the research, developing the culture of reading the reference books in the relevant discipline.

3.4.7 Additional infrastructure and amenities

An academic institution should provide additional infrastructure and other amenities needed for students and staff. They include students' Common Rooms, Toilet Blocks, cycle stand, car parking, Canteen, Student Activity Center, Alumni Center, Clinic, Shops, Provision for outdoor games, Open Air Theatre etc. These amenities cannot be considered as minimum requirements for the normal functioning of an institution. However, these facilities are considered as add-on to the overall physical environment and comfort to the students and staff.

As such, some of these amenities will have to be considered as the category of desirable norms.

a. Hostel/residential blocks:

It is desirable to have a separate hostel/residential block to accommodate the students and staff as per the need. The management efforts for the hostel would be focused on creating the good

academic as well as homely environment. The college could have its own hostel facility or it can manage by contracting the third party for the hostel facility.

b. Sports and recreational area

The space for the sports facilities are taken as an important tool for the maintaining the good physical as well as mental health. Therefore, it is desirable to manage the space for the sports events for students. Irrespective of number of student, some minimum facilities are required as per national standards; there should be minimum two outdoor games.

c. Open space and gardens

Well-managed open space around the academic premises would create the good and sound teaching-learning environment. Therefore, more the open space or gardens are preferred for the good academic institutions.

d. Canteen/Cafeteria:

A quality service in the canteen is directly related to the day-to-day students' health and hygiene. The canteen shall be established within the college premises. It is desirable that the canteen could accommodate about 10 % of total student's population at a time.

e. Health center

A college should have a small health clinic where students, staff and faculty could be treated for minor illness and in case of emergency. A part-time doctor should be available for limited hours in a week. The clinic shall have the availability of nurse or paramedics as applicable. Minimum Space required for the health clinic shall be 12.0 sq. m.

3.4.8 Occupational safety and health

Occupational Safety and Health (OSH), also known as workplace health and safety (WHS), is a field that focuses on ensuring the well-being and safety of employees at the workplace. It encompasses a wide range of measures and practices aimed at preventing accidents, injuries, and illnesses on the job. The entire physical facilities shall be well managed by considering the safety issues. There shall be well defined and widely circulated rules and regulations for the application of laboratory equipment as well as other facilities. Key aspects of occupational health and safety include:

- **Hazard Identification**: Identifying and assessing potential hazards in the workplace, such as chemicals, machinery, or ergonomic issues.
- **Risk assessment:** Evaluating the level of risk associated with identified hazards and developing strategies to mitigate them.

- **Safety regulations:** Adhering to local and national laws and regulations related to workplace safety.

- **Training and education**: Providing employees with the knowledge and training necessary to work safely and recognize potential hazards.

- **Safety Equipment:** Ensuring the availability and proper use of personal protective equipment (PPE) and safety devices.

- **Health Promotion**: Promoting overall employee health and wellness, which can include programs to address physical and mental health.

- **Emergency Response**: Developing plans for responding to workplace emergencies, such as fires, chemical spills, or medical incidents.

- **Reporting and Investigation:** Establishing procedures for reporting accidents and incidents, as well as investigating their causes to prevent future occurrences.

- **Compliance and Audits:** Conducting regular inspections and audits to ensure that safety measures are being followed.

- **Continuous Improvement:** Continuously evaluating and improving safety practices based on changing circumstances, new technologies, and lessons learned and feedback.

3.4.9 Computer laboratory

Any program of the engineering contains several courses requiring the computer laboratory, such as Numerical Methods, Computer programming, and others. Furthermore, a significant percentage of students of Seventh and Eighth semester are engaged in the projects requiring computational facilities. The requirement of computer facilities shall be added if the college is offering a Bachelor degree programs like Computer Engineering, Information Technology Engineering, Software Engineering and others.

For non-computer related engineering programs, at least **one computer laboratory** (24 computers plus 3 computers in case of emergency and breakdown) shall be established.

For computer related programs total number of computer terminals required should be **equal to 50 % of the total number of students** in the respective program. It is desirable to have 3 more computer terminals to meet the needs of the staff and emergencies arising out of breakdown.

- The computer system will have to be provided with appropriate storage capacities, software and uninterrupted power supply and internet.

3.4.10 Project or Research laboratory

- Engineering Students in the final year shall be engaged in the project works. Most of the engineering projects at Bachelor's level are related to the design, analysis, modeling of engineering issues. Generally, these types of tasks in the engineering projects require computer application. Therefore, additional laboratory with the computer facility and broadband internet connection are required. These laboratories can be useful for the teaching/training of the engineering software and other applications.
- These laboratories are always could be fitted with the high quality multimedia and the video-conference facilities for online meeting and conducting external online lectures. These laboratories shall have at least 24 computer terminals (half group: 24 students).

3.4.11 Parking area and access road

Parking space requirements for an engineering college can vary based on several factors, including the size of the college, the number of students and staff, the campus layout, local regulations, and the college's transportation policies as well as the college loaction. There are various factors to be considered for allocating the minimum parking space required in the college:

- Total number of students and staff: The total number of students and staff who need parking spaces is a critical factor.
- College location: The location of the engineering college can affect parking needs. Campuses in urban areas may have limited space and rely more on public transportation, while those in suburban or rural areas may require more parking space.
- Mode of transportation: The transportation preferences of students and staff play a significant role. Some may rely on public transportation, while others may commute by cars or private modes.
- Commuter vs. residential Students: If the college has a mix of commuter and residential students, college needs to account for the different parking needs of these two groups.
- Time of day: Consider the peak hours of parking demand. Some colleges may have higher parking demand during specific hours, such as when classes start and end.
- Bicycle and alternative transportation: Encouraging the use of bicycles or alternative transportation may reduce the need for parking spaces and should be part of the overall transportation plan.

- Parking facility design: The design of parking facilities, including multi-level parking structures, surface lots, and efficient traffic flow, can affect the number of spaces needed.
- Land availability: The amount of available land for parking can limit or expand parking capacity. Some colleges may have limited space for parking, making it necessary to explore off-campus options or shared parking arrangements.
- Sustainable transportation initiatives: Implementing these initiatives such as carpooling programs, shuttle services, and electric vehicle charging stations can help reduce the demand for parking spaces and align with sustainability goals.

To determine the specific parking space requirements for an engineering college, a comprehensive parking study or analysis is often conducted. This study takes into account the factors mentioned above and helps colleges plan and design parking facilities effectively. Additionally, it is essential to regularly review and update parking space requirements to adapt to changing circumstances and trends in transportation and campus demographics.

The college shall determine the parking space requirements for college student as well as staff. The basic study of parking report shall be in place with the college. The monitoring team shall review the study report and make the decision of the adequacy of the parking space for the college.

Access Road: College location/premises shall be linked with the access road with good pavement surface. The location of the college shall be properly defined with the proper informative signage from the main roads. The access road shall have properly maintained road signs and other traffic control devices.

3.4.12 Drinking water supply

Drinking water supply at colleges is an essential aspect for ensuring a healthy and safe environment for students and staff. It involves providing clean and safe drinking water as well as proper disposal of wastewater. Basic requirements can be listed as:

- Clean Drinking Water: Colleges should have the facility of clean and safe drinking water. This water should meet health and safety standards to ensure it is free from contaminants.
- Compliance with Regulations: Colleges are typically subject to national regulations governing drinking water quality and sanitation. Compliance with these regulations is crucial for the health and safety of the campus community.

- Infrastructure and Maintenance: The infrastructure for water supply, waste management and sanitation, including pipes, water fountains, and restroom facilities, should be well maintained to prevent from health hazards.

- Hygiene Education: Colleges should provide education on proper hygiene practices to promote a healthy campus environment. This may include initiatives like handwashing campaigns and awareness about safe water usage.

3.4.13 Other support systems

Additional support systems are vital for the better academic activities. These supports are managed on the specific needs and requirements of an educational institution. These requirements are not considered as the prerequisite for the academic programs, but indirectly enhance the overall ambience of the colleges. Here are some common support systems for ambience in the college. There are some examples as:

- Power backup system,
- Multimedia projectors or smart display system,
- Internet facility,
- Sanitary corner,
- Fire extinguisher,
- Emergency scape
- Transportation facility: Bus, Car etc.

3.4.14 Disable friendly classroom and other facilities

Creating a disabled-friendly classroom and other facilities in engineering colleges is essential for ensuring that all students, regardless of their physical abilities, have equal access to education and campus life. Here are key aspects and considerations for making these facilities inclusive:

Creating a disabled-friendly classroom and other facilities in engineering colleges is essential for ensuring that all students, regardless of their physical abilities, have equal access to education and campus life. Here are key aspects and considerations for making these facilities inclusive:

- Physical Accessibility to the classrooms: Ramps and Elevators could be the means for the better physical access to the classroom. It is desirable that, buildings have ramps and elevators for easy access to different floors.
- Wide Doorways: Doors should be wide enough to accommodate wheelchairs.

- Adjustable Desks: Provide desks that can be adjusted in height to accommodate wheelchair users.
- Accessible Seating: Reserve accessible seating areas in classrooms.
- Accessible Toilets: Installing grab bars and enough space for wheelchair maneuvering.

3.4.15 Furniture and lighting

The requirement of the furniture and lighting system shall be properly arranged for specific needs of each space, functionality, comfort, and durability. Additionally, consulting with interior designers or furniture experts can be helpful in making informed decisions.

- Classroom Furniture: furniture shall be managed as per the types of classroom such as desks, chairs, and tables. These may vary depending on the specific needs of each classroom, such as lecture halls, laboratories, or smaller seminar rooms. These spaces shall have adequate lighting for effective operations.

- Library Furniture: College libraries often have study areas with different types of seating, study carrels, and shelves for books and resources. Adequate lighting is important in these areas for reading and studying.

- Common Areas: Common areas such as student lounges and cafeterias may have a variety of seating options, including sofas, chairs, and tables for students to socialize and relax.

- Lighting: Proper lighting is crucial in college spaces. Classrooms and study areas should have appropriate overhead lighting, while task lighting may be used in libraries for reading. Energy-efficient lighting is often preferred to reduce operating costs.

- Sustainability: Many colleges are increasingly focused on sustainability. This may influence the choice of eco-friendly and recyclable furniture and energy-efficient lighting.

- Safety and Compliance: Furniture and lighting should meet safety standards and regulations to ensure the well-being of students and staff.

- Aesthetics: Aesthetic considerations are also important. The choice of furniture and lighting can affect the overall environment and design of the college spaces.

3.4.16 Toilets and sanitation system

Waste management and sanitation facilities shall be adequately managed. These facilities should be well-maintained and clean to promote hygiene.

The college building shall manage adequate number of toilet blocks with urinals, lavatories and wash basins, properly distributed. It is also necessary to provide one toilet block separately for women. Further, separate toilet block may be provided for the staff. The requirements for the toilet facility for the academic institution shall be complied with the prevailing Building Norms of the respective authority.

Toilets shall be constructed for differently abled person separately. It is desirable that all the facilities should be built with due consideration for the differently abled people.

3.5 HUMAN RESOURCES

Human resource requirements for an engineering college depend on the number of students, programs, and college's organizational structure. Major categories of the human resources needed for an engineering college are described below.

- Principal as an administrative head: College Principal or Director of the School or Campus Chief are given the responsibility of overall leadership and administration in an engineering college. This position is academic position, therefore the principal shall be appointed among the faculty of the engineering college. It is desirable that, he/she be from the engineering background.
- Head of Departments (HoD): the senior faculty member of the same engineering field leads Department. Therefore, the Head of Department (HoD) must be appointed from concerned engineering departments of the colleges/campus/schools. He/she is responsible for conducting all academic programs as per the curriculum and heads the academic administration of the department.
- Faculty members: Professors, Associate Professors, and Assistant Professors or Lecturers are major category of faculty member. Generally, faculty members are given the responsibility to lead the examination section, research section, and other units in the college.
- Laboratory heads and instructors: head of laboratory is responsible for the operation of all laboratories and workshops. He/she shall assign the tasks to the instructors and other supporting staff for practical works in the Department.
- Librarians: the responsibility of library management is given to the qualified Librarian.
- Facility manager: the management and functioning of the all physical resources is the responsibility of facility manager. He heads the team of the supporting staff for the proper management and operation of physical resources and related assets in the college.

The specific positions, roles and their numbers will depend on the size of the engineering college, the number of students, the range of engineering programs offered, and the college's strategic goals. As the college evolves and grows, human resource requirements may change, so it is essential to conduct regular staffing assessments and planning to ensure the effective operation of the institution.

Staff Structure of an institution will depend on multiple factors which primarily is defined by the curriculum structure, work-schedules (weekly, semester and annually), student intake, disciplines offered, instructional methods and media employed, student contact hours, group and class sizes, co-curricular and extra-curricular activities requiring staff involvement and training and development of staff themselves. It is recognized that some of these factors will vary from institution to institution. Hence, only such major factors which are broadly common to institutions across the country are considered in stipulating the staff structure. Within the stipulated structure, flexibility to take into account the variable institutional factors are permitted, so long as such flexibility contributes to improve efficiency and effectiveness and promotion of excellence.

3.5.1 Recruitment of faculty members

Faculty recruitment in an engineering college involves hiring qualified individuals to teach and conduct research in various engineering disciplines. The recruitment procedure shall be transparent and in accordance with the faculty recruitment bylaw of the institution. A typical process of hiring the faculty may include the following steps:

- Job posting: The College shall create a job posting or advertisement for the open faculty positions, specifying the qualifications, responsibilities, and requirements. The advertisement of the position shall be posted in the college website and in the National newspapers at once.
- Application Submission: Prospective candidates interested in the position will submit their applications, which typically include a resume or curriculum vitae (CV), cover letter, and relevant academic transcripts and certificates.
- Shortlisting: The College’s selection committee will review the applications and shortlist the candidates who meet the basic qualifications and requirements. The selection committee should invite the senior faculty member for the evaluation of the CV for short-listing.
- Interview process: Shortlisted candidates may be invited for an interview, which can be conducted in person. The interview panel may consist of members of selection committee and an external expert.

- Teaching and presentation: Candidates may be asked to give a presentation on their teaching skill and interests.
- Reference Checks: The College may contact the candidate's references to gather additional information about their qualifications and experience.
- Probation and tenure: New faculty members may have a probation period during which they are evaluated for their teaching, research, and service contributions. Successful faculty may eventually be granted tenure, which provides job security and long-term employment. These aspects of the employment shall be included in the Employee bylaw.

It is important to note that the specific details and requirements for faculty recruitment can vary from college to college. The exact process and criteria will depend on the college's policies and priorities.

3.5.2 Faculty strength

Faculty strength can be considered as the availability of faculty members, ratio of senior faculty members, and number of prominent faculty members.

- Faculty to student ratio

Faculty strength is important criteria in order to impart the quality of engineering program. The total number of faculty and student ratio shall **not be less than:**

- For Bachelor's programs - 1:15,
- For Master's programs – 1:10

Faculty involvement in term of the class size (student number) shall also be maintained as mentioned in the table below.

Table 7: Teaching staff and student ratio for classes in **Bachelor's** programs

S/N	Type of the classes	Teacher student ratio
1	Lecture Classes	1:48
2	Tutorial Classes	1:24
3	Laboratory/workshop/drawing classes	1:24
4	Project work (maximum number of student in a project group shall not exceed 6)	1:6 (one teacher for each project-group)

- Full time faculty members

A full time faculty member is defined as the formally appointed teaching staff for defined duration. The full time faculty members should be available during the college hour. The employees' byelaws and similar legal provision shall govern appointment and other service conditions of the full time faculty. The full time faculty shall be more than 50 % of the total faculty required.

- Ratio of senior to junior faculty

Faculty strength in terms of the availability of the senior faculty positions is very vital for the teaching learning process. These faculties could guide the junior faculties of the institutions. Generally, engineering programs teaching staff/faculty member are categorized as below:

- Assistant Lecturer /Teaching Assistant
- Lecturer / Assistant Professor
- Reader / Associate Professor
- Professor

The proportion of senior and junior faculty members shall be maintained as:

- For Bachelor's Programs: Professor: Associate professor/Reader: Lecturer/assistant lecturer shall be 1:2:10,
- For Master's Program: at least one Professor (equivalent qualifications) for each Programs

Faculty members are mainly responsible for conducting academic courses, research and development activities. Furthermore, the senior faculties are encouraged in taking academic cum administrative responsibilities.

Job responsibilities, qualifications and experiences required for assistant Lecture/teaching assistant are mentioned in Table 8, for lecturer/assistant professor Table 9, for Associate Professor/Reader in Table 10 and for professor in Table 11

Table 8: Job responsibilities and qualifications for Assistant Lecturer/Teaching Assistant

Job Responsibility	Qualification and Experience
• Teaching in the tutorial classes under the supervision of Lecturer, • Instruction in laboratory • Students assessment and Evaluation • Assisting in Consultancy and R & D Services	• Minimum Bachelor's Degree in appropriate branch of Engineering or Technology, • Desirable, M. Sc. in appropriate branch of Engineering and Technology • M. Sc. in appropriate branch of study in the case of teaching posts in Humanities and Science Departments,

Job Responsibility	Qualification and Experience
• Co-curricular and extra-curricular activities • Assisting in departmental administration	

Table 9: Job responsibilities and qualifications for Lecturer/Assistant Professor

Job Responsibility	Qualification and Experience
• Conducting lectures/ tutorials and laboratory works, • Students assessment and Evaluation • Involvement in Consultancy and R & D Services, • Developing resource material and laboratory instructions • Co-curricular and extra-curricular activities • Assisting in departmental administration	• M. Sc. in appropriate branch of Engineering or Technology with minimum one year teaching experience • Ph. D. in any appropriate field of Engineering and Technology, • M. Sc. in appropriate branch of study in the case of teaching posts in Humanities and Science Departments with minimum two years of teaching-experience.

Table 10: Job responsibilities and qualifications for Reader/Associate Professor

Job Responsibility	Qualification and Experience
• Conducting lectures/ tutorials and laboratory works, • Academic project works, • Research activities and guidance, • Engagement in consultancy services • Curriculum Development and developing resource materials • Conducting training programs for teachers and staff • Academic and administrative planning and development work at departmental level and assisting at institutional level, • Students counseling and interactions	• M. Sc. in appropriate branch of Engineering and Technology with minimum 10 year teaching experience, or • Ph. D. in any appropriate field of Engineering or Technology with 8 years of teaching experience or 10 years of industrial/research experience, • Ph. D. in appropriate branch of study in the case of teaching posts in Humanities and Science Departments with minimum 8 years of teaching experience. • Minimum **four** publications in the peer reviewed journal in the relevant field,

Job Responsibility	Qualification and Experience
• Co-curricular and extra-curricular activities	

Table 11: Job responsibilities and qualifications for Professor

Job Responsibility	Qualification and Experience
• Conducting lectures/ tutorials and laboratory works, • Academic project works, • Research activities and research guidance, • Engagement in consultancy services • Curriculum Development and developing resource materials • Conducting training programs for teachers and staff, • Academic and administrative planning and development work at departmental level and assisting at institutional level, • Students counseling and interaction • Co-curricular and extra-curricular activities	• Ph. D. in any appropriate field of Engineering or Technology with 10 years of teaching experience or 15 years of industrial/research experience, • Ph. D. in appropriate branch of study in the case of teaching posts in Humanities and Science Departments with minimum 10 years of teaching-experience. • Minimum **eight** publications in the peer reviewed journal in the relevant field,

- Prominent faculty members

Engineering colleges often look for individuals as the prominent faculty member with the sound academic background and Ph.D. level degree with the experience in the relevant engineering. In addition to these basic qualifications, a person with one of the below mentioned qualifications or combination of qualifications is considered as the 'prominent faculty'. Additional qualifications for the prominent faculty member can be mentioned as:

- Research publications: A track record of accomplishment of publications in reputable journals and conferences is highly valued: track-record of research publication shall be assessed in terms of H-index and Citation. These indicators depend on the specific field of engineering and minimum five publications in SCImago,
- Achievement of title of professor from the renowned institutions: he/she has the teaching experience at reputed world class universities,

- Industry experience: Practical industrial experience can be beneficial, especially for faculty positions emphasizing real-world applications,
- Professional affiliations: Membership in professional engineering organizations, or involvement in relevant committees or activities within these organizations,
- Innovation and creativity: person with the demonstrated ability to contribute to the development of innovative engineering solutions,
- Professional awards: Person with the nationally or internationally renowned engineering awards,
- Leadership quality: a person with the leadership qualities, especially if the faculty position involves public or administrative roles,

An individual having any one or the combinations of above qualifications can be considered as the prominent faculty in engineering.

3.5.3 Qualified academic and administrative Heads

Campus Chief, School Director or the Principal and Head of Departments are considered as the academic positions. They work for the overall academic excellence of the institute. Laboratory in charges are also taken as the academic positions. Similarly, administrative chief and the head of library are considered as the administrative staff.

- Head of Institution

The principal of an engineering college is typically the chief executive officer, responsible for overseeing the overall functioning of the institution. The role of principal involves setting academic goals, managing administrative tasks, maintaining the quality of education, fostering a conducive learning environment, and often representing the college in various forums. He/she is key person in decision-making, implementing policies, and ensuring the college meets educational standards while promoting growth and development. However, the specific duties and authority might vary based on the college's structure, policies, and governing bodies.

The minimum qualification of the Head of the Institution (Principal Campus Chief/ Directors) shall be Master’s Degree in Science, Technology, Engineering and Mathematics (STEM).

- Department Heads /Program Coordinator

Head of Department (HoD) must be at least Master’s Degree holder in the relevant engineering discipline. Generally, the Head of the Department (HOD) is a senior faculty member responsible for managing the operations, academic affairs, and overall functioning of a specific engineering department, such as Civil Engineering, Mechanical Engineering, Electrical Engineering, etc. The HOD usually oversees the department's faculty, curriculum implementation, research

activities, and administrative tasks. The role of HoD involves ensuring the department's smooth functioning, fostering research, and maintaining academic standards.

The academic department in colleges plays a crucial role in various aspects of the educational activities. These departments are responsible for managing and delivering academic programs, courses, and curricula within their specific disciplines. Here are some key roles of academic departments in colleges:

- **Curriculum management**: Academic departments are responsible for planning and managing courses to be taught within the specific semester/year of academic calendar. Departments prepare the course/class routines by considering the available infrastructure, number of teacher and classes, and routines of other departments within the institution. The departmental head shall be responsible for the implementation of the routines as per the course syllabus as prescribed for example, numbers of Lectures, tutorials, laboratories and field visits for specific courses.
- **Conducting non-credit courses:** Department shall manage the relevant non-credit courses for each semester/year of the particular program. It shall be determined as required in the market as well as for the professional career of the graduates.
- **Faculty Recruitment and Development**: Academic departments are involved in the recruitment and hiring of faculty members who are experts in their fields. They also support faculty development through workshops, training, and opportunities for research and advancement.
- **Academic Advising:** Academic departments provide academic advising to students within their disciplines. They also help students with course selection (electives), academic planning, and ensuring they meet the requirements for graduation.
- **Research activities:** Academic departments are engaged in research and development activities. They contribute to the advancement of knowledge in their fields and encourage faculty and students to participate in research projects and publications.
- **Assessment and Examination**: Academic departments are responsible for assessing student-learning outcomes and ensuring that their programs meet the necessary requirements as per the prescribed evaluation system. Departments are responsible for the internal evaluation as well as assessment of students' performance during the semester/year.
- **Student Support:** They offer academic support and resources to students, such as tutoring, study groups, and academic workshops and carrying out the project works.

- **Interdisciplinary Collaboration**: Academic departments often collaborate with other departments to offer interdisciplinary programs or courses that integrate knowledge from multiple disciplines.

A Program Coordinator generally manages Master's Programs. He/she shall have the Ph. D. in engineering subjects. However, the Program Coordinator is preferred to have minimum qualifications for professor (equivalent) in engineering subjects.

- Library Head

The head of library of an engineering college is typically important position. A Librarian is a professional who facilitates access to information and resources within a library. He/she curates collections, develop educational programs, manage databases, and oversee library staff. Main role is to support learning, research, and exploration for library members.

Library head shall possess the Bachelor's degree in library management/science. Alternatively, minimum qualification of a library head can be considered Bachelor's degree in any stream with three months training in library management.

- Laboratory in-charges

Laboratory works are vital for the engineering discipline. The practical works shall be well managed as per the class routines. These practical works shall be performed skillfully. Therefore, laboratory instructions are very important part of the courses. The sequences, carefulness in carrying out the works, measurement of results and report writing are the major tasks in the laboratory. Therefore, the laboratory head shall have good experience and knowledge on those matters. The respective subject teacher explains the theoretical aspects of the laboratory works. Whereas, practical or experimental or execution of some tests or practical are instructed (or demonstrated) by the head of the laboratory/lab instructor. Therefore, the minimum qualifications and experience are important for this position.

The minimum qualification for the laboratory head/in charge shall be the academic degree of diploma in the relevant field of the engineering.

- Head of Research

Research Management Unit (RMU) within an engineering college typically involves overseeing and supporting various research activities. It is an important part of the college to handle the academic as well as research projects. The scope of the work of the typical RMU can be taken as:

- Capacity building activities for faculty member in research such as training for research methodology, proposal writing, and specific research tools,
- Planning, implementing, monitoring and evaluation of academic research projects with the internal funding,
- Participating and exploring various external resources of research funding such as Government, industries, professional societies,

- Initiatives for research collaborations with other institutions,

A competent person, which is a faculty member, shall be appointed as the head of the RMU (as the research coordinator). For this position, person with the research tracking record shall be preferred.

- Bachelor's program: The Head of the Research shall have Ph. D. degree in in Science, Technology, Engineering and Mathematics (STEM).
- Master's Programs: The Research Head shall have Ph. D. Degree in relevant engineering subject.

3.5.4 Research Publications of the faculty

Publications of the research article is the most important strength of the individual in the teaching profession especially at the university level. Any publications of the scientific article in the peer review journal with higher indicator is preferred for the teaching profession in the University.

Evaluating research publications of faculty members in colleges involves assessing the quality, impact, and relevance of their work. There are several ways to do this:

- Peer Review and Journal Rankings: it is to evaluate that journals are ranked in terms of impact factor, citations, and reputations.
- Citation Analysis: it is important to note that how often their work is cited by other researchers. Higher citations generally indicate influence and quality.
- H-Index: this index measures both the productivity and impact of the published work of a scientist or scholar. This is the combined metric of the number of publications and the number of citations per publication.
- Publication Metrics: Platforms like Google Scholar, Scopus, or Web of Science provide publication metrics, citation counts, and author profiles, aiding in evaluating faculty research impact.
- Research Grants and Awards: Consider any grants received or awards won by faculty for their research. This can indicate the significance and recognition of their work.
- Expert Reviews: Sometimes, expert opinions or peer reviews within the academic community can offer valuable insights into the quality of a faculty member's research.

It is worthy to note that, evaluating the research is multifaceted. It is not just about quantity but also about the impact and quality of the work. Each metric gives a different perspective, and a combination provides a more comprehensive evaluation. The colleges has to encourage the faculty members to publish their research results in the reputed journals.

3.5.5 Trained Faculty Members

In this indicator, ratio of the trained faculty members is taken as the measure of the strength of the human resources in the institution. The training programs shall be developed as per the

faculty needs and shall have specific skill orientated. Training programs shall be implemented as below:

- Conducting Training Needs Assessment (TNA),
- Institution shall make plan and execute the training modules for faculty members,
- College shall maintain updated systematic records on the trainings conducted for faculty,
- Training for faculty members

In the process of college monitoring, the number of trained faculty is taken to measure the criteria as below:

- Ratio of trained faculty to the total number of faculty

The training modules shall be related to the teaching methodology, specific subject matters, and other professional subjects. Similarly, the duration of the training modules should not be less than **one week** to be considered in the monitoring process.

- Participation of faculty in Conference/workshop/seminars

Faculty-members' participation is encouraged for dissemination of research results and other projects reports in academics as well as professional field. These shall be selected with the peer review process in form of oral or poster presentation. These conference/workshop/seminars shall be in the form of national or international level. These criteria will be evaluated by considering the number of participations in the event in a year.

3.5.6 Faculty and Staff Impression

Institutional efforts for the qualified and dedicated faculty and staff are important factors to evaluate the intuitional potential in the Human Resource criteria. The monitoring team during the college observation shall organize the interaction and consultative meeting with faculty and staff. The team shall carry out the overall assessment of this criterion based on the employees' views and understanding about the institutional support for their professional career as well as teaching learning environment.

The team shall make the statement of evaluation as "fully satisfied faculty and Staff" or "moderately satisfied faculty and staff" as the result of the interaction with them.

3.6 STUDENT WELFARE AND SUPPORT ACTIVITIES

In engineering colleges, student welfare and support activities are designed to enhance the overall well-being and academic success of students. The range of activities conducted by the college shall enhance the students' capacity and confidence to deal with the challenges to be faced after graduation. Here are some common initiatives and activities:

- Mentorship programs: Many engineering colleges have mentorship programs where senior students or faculty members' guide and support new students, helping them navigate academic challenges and college life.
- Counseling services: Counseling services are often provided to assist students with personal, academic, or career-related issues. Professional counselors may be available on campus to offer guidance and support.
- Tutoring and academic Assistance: Engineering colleges may offer tutoring services, study groups, or academic workshops to help students succeed in their coursework. These resources aim to support students in understanding complex engineering concepts.
- Health and wellness programs: Colleges may organize health and wellness programs, including fitness classes, mental health workshops, and awareness campaigns to promote a healthy lifestyle among students.
- Financial aid and scholarships: Providing information on financial aid options, scholarships, and part-time job opportunities is crucial for students facing financial challenges. This support can ease the burden of tuition and living expenses.
- Career development services: Engineering colleges often have career services departments that assist students in preparing for internships, co-op programs, and job placements. This includes resume building, interview preparation, and networking opportunities.
- Student clubs and organizations: These groups provide students with opportunities to connect with like-minded peers, engage in extracurricular activities, and develop leadership skills. They contribute to a sense of community and belonging.
- Diversity and inclusion initiatives: Colleges may implement programs to foster diversity and inclusion, ensuring that all students feel welcome and supported regardless of their background.
- Workshops on life skills: Workshops on time management, communication skills, and stress management can be beneficial for students as they navigate the challenges of academic and personal life.
- Housing assistance: Providing information and support for on-campus or off-campus housing can be crucial for students, especially those who are not familiar with the local area.

These activities collectively contribute to creating a supportive environment for students in engineering colleges, helping them thrive academically and personally. The monitoring of the college with respect to these criteria can be taken based on the following indicators:

3.6.1 Financial aid and scholarships

Scholarships and financial support for students in engineering program are crucial to help alleviate the financial burden associated with pursuing higher education. There are various types of financial aid available for engineering students, including scholarships, grants, fellowships, and loans. The college shall implement the scholarship and student financial assistance as per the policy prepared and approved by the governing body of the institution.

The college could develop their policy on the student assistances on the basis of their financial need by the involvement in some project works, teaching assistantship (for final year students) and other loan provisions.

Similarly, college may arrange various approaches for the financial support to the students such as:

- Private Scholarships: Numerous private organizations, foundations, and companies offer scholarships for engineering students. These may be based on factors such as academic performance, financial need, or specific areas of study within engineering.
- Professional Organizations: Engineering-related professional organizations often provide financial support to students.
- Corporate Sponsorships and Internship Programs: Some companies offer financial support to engineering students through scholarship programs or as part of internship opportunities. These can sometimes lead to employment opportunities after graduation.
- Research Grants and Fellowships: Engineering students engaged in research may be eligible for grants or fellowships to support their work. These can come from government agencies, private foundations, or academic institutions.
- Loan Programs: the college could take the load guarantees and repayment responsibility for the students who are weak in financial condition. Sometimes, students may choose loans to finance their education. The college shall have the good linkage with the banks and other financial institutions.
- Work-Study Programs: Some universities offer work-study programs that allow students to work part-time jobs on campus to help cover their educational expenses.

The effectiveness and financial support is very much relied on the college efforts for the real welfare intention. It could give very positive results in long term.

3.6.2 Mentoring and counseling services

Student mentoring and counseling in engineering colleges play a crucial role in supporting students throughout their academic journey. These activities are mainly related to the following aspects:

- Academic Guidance: Mentors (they are senior students or faculty members) provide academic guidance, helping students navigate through their coursework, choose appropriate electives, and plan their academic paths.
- Career Counseling: Career counseling is a significant aspect, with mentors assisting students in understanding various career options, industry trends, and helping them make informed decisions about their future.
- Personal Development: Mentoring goes beyond academics, focusing on personal development. Mentors can offer advice on time management, stress management, and effective study habits.
- Goal Setting: Mentors help students set realistic academic and career goals. They assist in breaking down long-term goals into manageable steps and monitor progress.
- Problem Solving: Students often encounter challenges, both academic and personal. Mentors serve as a resource for problem-solving, providing guidance and support.
- Motivation and Confidence Building: Mentors play a role in motivating students, boosting their confidence, and helping them overcome self-doubt. Positive encouragement is essential in fostering a healthy learning environment.
- Building Networks: Mentors can help students connect with professionals in the industry, facilitating networking opportunities and internships.
- Emotional Support: College life can be stressful, and students may face emotional challenges. Mentors offer a supportive ear, helping students cope with stress, anxiety, and other emotional issues.
- Monitoring Progress: Regular check-ins with mentors allow for the monitoring of academic progress, ensuring that students are on track to meet their goals.
- Feedback and Evaluation: Mentors provide constructive feedback on assignments, projects, and overall performance, aiding students in improving their skills.
- Preparation for Further Studies or Employment: Mentors assist students in preparing for post-graduate studies or entering the workforce by providing guidance on applications, interviews, and resume building.

These aspects collectively contribute to a holistic approach to student mentoring and counseling in engineering colleges, fostering an environment that supports academic and personal growth

During the mentoring the team would discuss on the system of mentoring and counseling activities for all students, may it be new students or senior students. Similarly, the college shall have well maintained documents for the establishment such units and the implementation records.

3.6.3 Students' exposure to the industries or communities

Students' exposure to the local as well as industrial or professional communities imparts the knowledge on the societal issues and relevant engineering scope on these issues. The engineering shall arrange the students' participation on events organized by the professional societies or industrial associations and their alliances.

This criterion shall be evaluated in the form of plans and participation records in the event.

3.6.4 Grievance redress and feedback system

In an engineering college, a grievance redress and feedback system is typically a structured mechanism for students, faculty, or staff to express their concerns, complaints, or feedback regarding various aspects of the institution. This system aims to address grievances promptly and enhance the overall quality of education and campus life. Here are some common features and practices:

- Online Portal: Many colleges provide an online platform where students and other stakeholders can submit their grievances or feedback. This portal is often accessible through the college's website or a dedicated online platform.
- Anonymity: To encourage honest feedback, some systems allow users to submit their grievances or feedback anonymously. This can be particularly important for sensitive issues.

A grievance redressing mechanism shall consist of the following components for its effective implementation:

- Categorization: Grievances and feedback are usually categorized based on the nature of the concern, such as academic issues, infrastructure, faculty behavior, administrative concerns, etc.
- Tracking and monitoring: Once a grievance is submitted, the system may have a tracking mechanism to monitor the progress of its resolution. This ensures accountability and transparency in the redress process.
- Timely resolution: Colleges strive to address grievances in a timely manner. There may be predefined timelines for acknowledging, investigating, and resolving different types of grievances.
- Feedback collection: Apart from grievance redress, the system may also include a module for collecting general feedback on various aspects of the college, such as teaching quality, facilities, and extracurricular activities.
- Regular review: Institutions often review the data collected through the system periodically to identify trends, areas for improvement, and success stories in grievance resolution.

- Communication: Clear communication channels are established to keep complainants informed about the progress and resolution of their grievances.

It is important to check the specific policies and procedures of the engineering college in question, as the details of the grievance redress and feedback system. This information can usually find in the college's official handbook, website, or by contacting the relevant administrative office.

3.6.5 Skill development training programs

It is desirable that a new engineer or recent graduate engineer is able to perform some skills required to the engineering industry. These skills are generally specific and unique for each student. These skills could be imparted to the students from the vast engineering real world of engineering. Because, these specific skill could not be developed within the framework of regular course work and curricular activities. Therefore, colleges could take initiatives to start some skill development training programs, which would be the showcase skills to the new graduates. These courses or training programs shall be developed by considering the personal interest and market needs or recent trends. There are some areas of the skill development training modules in the engineering colleges.

- CAD skills: most of the engineering fields are related to the application of CAD in the design of engineering elements/objects. Colleges may explore some specific and needs based CAD toolkits and conduct trainings to the students.
- Programming languages: Learning programming languages such as Python or MATLAB or others can help students to make familiar to apply the tool for specific engineering field. Furthermore, it would be helpful in understanding the core engineering issues in detail.
- Data Analysis: Analyzing data is an essential skill for understanding complex systems and identifying patterns. This skill is useful for each engineering field.
- Soft skills for engineering: Soft skills are equally important for success in the engineering industry as other technical skills. These soft skills can be taken as effective communication, teamwork and leadership, project management and others. These skills develop the confidence of an individual engineer especially the new graduate.
- Industry knowledge and trends: Staying up-to-date with industry knowledge and trends is crucial for success in the engineering industry. Students shall be oriented or informed in these aspects and develop the attitude to read industrial publications, attend industrial events (conference, seminars, workshops etc.) network with industry professionals, and others.

- Trainings of specific engineering skill: these training programs shall accommodate the specific need of the industry as well as the students' interests. College may develop some of the training modules for students in the areas of core engineering subjects.

The development of the skill oriented training programs, ***needs assessment*** shall be conducted for the group of students and available resources of the college and in the local markets.

3.6.6 Promotion of entrepreneurship

Promoting entrepreneurship among engineering students is most important for fostering innovation, creating job opportunities, and driving economic growth. There are several approaches to encourage and support entrepreneurship among engineering students:

- Entrepreneurship education: college shall organize or integrate entrepreneurship courses and workshops as part of the extracurricular activities. These initiatives provide students with the knowledge and skills needed to identify opportunities, develop business plans, and navigate the entrepreneurial process.
- Incubators and accelerators: it is desirable to establish on-campus or affiliated incubators and accelerators where engineering students can develop and refine their startup ideas. These spaces often provide mentorship, resources, and networking opportunities.
- Mentorship programs: the linkage of engineering students with experienced entrepreneurs and industry professionals who can serve as mentors. These mentors can provide guidance, share insights, and offer practical advice on starting and running a business.
- Startup competitions: Organizing and supporting the startup competitions and pitch events specifically for engineering students may develop the skill to initiate business. These competitions can provide a platform for students to showcase their ideas, receive feedback, and win funding or other resources.
- Networking events: networking events could bring together engineering students, alumni, industry professionals, and potential investors. Networking is crucial for building relationships and gaining valuable insights into the entrepreneurial ecosystem.
- Industry partnerships: partnerships with industry organizations and companies to provide students with real-world insights and potential collaboration opportunities is one of the effective way to develop entrepreneurship for engineering student.
- Success Stories: it is important to share success stories of engineering student entrepreneurs who have successfully launched startups. These stories can inspire and motivate current students to pursue their entrepreneurial aspirations.

By implementing these ideas, engineering colleges can create a supportive environment that encourages engineering students to explore entrepreneurship, take risks, and transform their innovative ideas into successful ventures.

3.6.7 Resource centers

Engineering colleges shall establish student resource centers for academic support, professional development, and community building. The specific resources and services offered may vary from one engineering field to another. These resource centers are focused mainly on the extra-curricular aspects. Some examples of resource centers are as below at engineering colleges:

- Tutoring services: tutoring services for the students may be categorized as peer-tutoring and professional tutoring. Student resource centers often provide peer-tutoring services where students can receive help from their fellow classmates who have excelled in specific courses. Similarly, some resource centers may also offer professional tutoring services for challenging engineering subjects.
- Study spaces: Dedicated study spaces equipped with computers, textbooks, and other resources can be beneficial for collaborative and individual learning.
- Workshops and seminars: Regular workshops and seminars on study skills, time management, and effective learning strategies can be organized to enhance students' academic performance.
- Career Counseling: Guidance on career paths, internships, co-op opportunities, and resume building can help engineering students prepare for their future careers.
- Networking opportunities: Events, mixers, and networking sessions with alumni and industry professionals can facilitate connections and provide insights into potential career paths.
- Project and research support: Assistance with engineering projects, research, and access to specialized resources or labs can be provided to support students' academic endeavors.
- Technology and software support: Access to engineering software, computer labs, and technical support for troubleshooting issues related to engineering tools and software.
- Library resources: Collaboration with the main library to ensure access to engineering-specific literature, journals, and databases.
- Student organizations support: Assistance for engineering-related student organizations, clubs, and competitions, promoting extracurricular involvement.

Resource centers with well-equipped and supportive environment can significantly contribute to the overall success and satisfaction of engineering students during their academic journey

3.6.8 Alumni Association

Alumni associations at engineering colleges play a crucial role in maintaining a strong connection between the institution and its graduates. These associations typically aim to foster a sense of community among alumni, support professional development, and contribute to the growth and reputation of the engineering college. Here are some common features and activities associated with alumni associations:

- Networking opportunities: Alumni associations organize networking events, and conferences to facilitate connections among graduates. These events may provide opportunities for alumni to meet, share experiences, and build professional relationships.
- Career services: Providing career-related resources such as job postings, career counseling, mentorship programs, and workshops to support alumni in their professional development.
- Professional development: Hosting workshops, webinars, and seminars on industry trends, new technologies, and skills development to keep alumni updated and competitive in their respective fields.
- Alumni mentorship programs: Establishing mentorship programs where experienced alumni can provide guidance and advice to recent graduates or those seeking career transitions.
- Alumni awards and recognition: Recognizing outstanding achievements of alumni through awards and honors, which not only celebrates individual accomplishments but also enhances the reputation of the engineering college.
- Social and cultural events: Organizing social gatherings, reunions, and cultural events to maintain a sense of community among alumni and encourage a lifelong connection to the engineering college.
- Contributions to the college: Alumni associations often contribute to the college's development by providing financial support, resources, or expertise. This may include funding scholarships, supporting research initiatives, or contributing to infrastructure improvements.
- Communication channels: Maintaining regular communication through newsletters, alumni magazines, and social media to keep graduates informed about the latest developments at the college and among fellow alumni.
- Student-alumni interaction: Facilitating interactions between current students and alumni, such as guest lectures, industry panels, or networking events, to provide students with insights into potential career paths.

- Online platforms: Creating online platforms or forums where alumni can connect, share experiences, and collaborate on various initiatives.
- Philanthropy and fundraising: Engaging alumni in philanthropic efforts to support the college's initiatives, scholarship programs, and infrastructure development.

The active engagement of alumni association provides meaningful opportunities for connection and support, engineering college for contributing to the ongoing success and development of both the institution and its graduates.

3.6.9 Students' Impression

Institutional efforts as mentioned above represent the overall student's support system of the college. The monitoring team during the college observation shall organize the interaction and consultative meeting with the students. The team shall carryout the overall assessment of tis criteria based on the students' views and understanding about the institutional support for their academic performances as well as teaching learning environment.

The team shall make the statement of evaluation as "fully satisfied students" or "moderately satisfied students" as the result of the interaction with the student.

4. BENCHMARKS FOR CRITERIA AND GRADING

4.1 CRITERIA AND WEIGHTAGES

The Inspection of the college on the basis of the criteria and respective sub-criteria is summarized in terms of the total marks obtained. These can be taken as the perception of the stakeholders regarding the quality of teaching learning environment and the performance of the college. Furthermore, these indicators are directly or indirectly related to the quality of the engineering programs. In addition, these indicators are supposed to be the helpful for the engineering graduate to perform his/her duty with the good technical as well as professional ethics. The criteria and respective weights for the recognition are given in the table below:

Table 12: Criteria and weightage for Bachelor's Programs (regular monitoring)

Criteria No.	Criteria	Score
Criterion I	Institutional Policy, Governance and Leadership	12.0
Criterion II	Curriculum Management and Teaching Learning Process	18.0
Criterion III	Research, Knowledge generation and Extension	8.0
Criterion IV	Physical Resources	25.0
Criterion V	Human Resources	25.0
Criterion VI	Students' Welfare and Support Services	12.0
	Total	**100.0**

Table 13: Criteria and weightage for Master's Programs (regular monitoring)

Criteria No.	Criteria	Score
Criterion I	Institutional Policy, Governance and Leadership	5.0
Criterion II	Curriculum Management and Teaching Learning Process	25.0
Criterion III	Research, Knowledge generation and Extension	30.0
Criterion IV	Physical Resources	10.0
Criterion V	Human Resources	25.0
Criterion VI	Students' Welfare and Support Services	5.0
	Total	**100.0**

4.2 GRADING SYSTEMS

The colleges are inspected or monitored for its recognition as per the prevailing rules. These rules have been elaborated in terms of criteria and indicators. These criteria has been further described in these guidelines. The score obtained by the colleges shall be well discussed and confirmed by the college and monitoring team during the field observation. The both sides shall agree the score of the assessment. The colleges or the academic institutions will be categorized into different grades based on the marks or score secured. The grading category of the institutions will be carried out as in the table below.

Table 14: Grading system of the colleges

Grade	Marks, Secured in the Evaluation
A	Above 80
B	Above 65 to 79.0
C	Above 50 to 64.9

5. CODE OF CONDUCT FOR INSPECTION AND MONIORING PROCESS

The entire assessment process of quality of the engineering colleges in terms of the several criteria and indicators is an important task of the monitoring/inspection team of the Nepal Engineering Council. Establishing and adhering to professional ethics and code of conduct, is crucial for ensuring the quality review of colleges. This helps to maintain integrity, transparency, and fairness in the evaluation process. Here are key principles that should be included in the professional ethics and code of conduct for quality review of colleges:

- Impartiality and objectivity: Reviewers should approach their work with impartiality, avoiding conflicts of interest and bias. The evaluation process should be objective, focusing on measurable criteria rather than personal opinions.
- Confidentiality: the evaluation shall ensure that information obtained during the quality review process is completed with utmost confidentiality. Reviewers should not disclose sensitive or proprietary information about the college without proper authorization.
- Professional competence: Reviewers team must possess the necessary expertise and competence to evaluate the specific aspects of a college. This includes staying informed about current educational practices and trends. Furthermore, team members shall be well familiar with the criteria and respective indicators.
- Integrity and honesty: the review or monitoring team should act with integrity and honesty, providing accurate and truthful assessments. Any conflicts of interest or potential biases should be disclosed transparently.
- Fairness and equity: The evaluation process should be fair and equitable for all colleges under review. Avoid favoritism and ensure that each institution is assessed based on the same set of standards.
- Respect for diversity: Recognize and respect the diversity of colleges, acknowledging that different institutions may have unique missions, goals, and student populations. Evaluate each college within its specific context.
- Timeliness and responsiveness: Conduct the reviews/monitoring in a timely manner and provide prompt feedback to colleges. Respond to inquiries and concerns raised by colleges in a timely and professional manner.
- Transparency: the team shall clearly communicate the criteria and indicators used in the evaluation process to colleges. Transparency helps build trust and allows colleges to understand the basis for the review outcomes.
- Encourage the quality improvement: the review team shall always positively communicate in favour of the quality to be improved in the future. Regularly assess and update evaluation methods, criteria, and standards to reflect advancements in the field of education.
- Accountability: the team of the assessment shall be accountable within the quality review process and their final statements.
- Adherence to laws and regulations: the team hall be familiar with the relevant laws and regulation regarding the educational as well as university and colleges. The review hall comply with the NEC bylaw as well.
- Stakeholder Involvement: the process of the assessment and field verifications shall be carried out together with the responsible person of the college. Furthermore, the stakeholder consultation and interaction is necessary for the various aspects of the

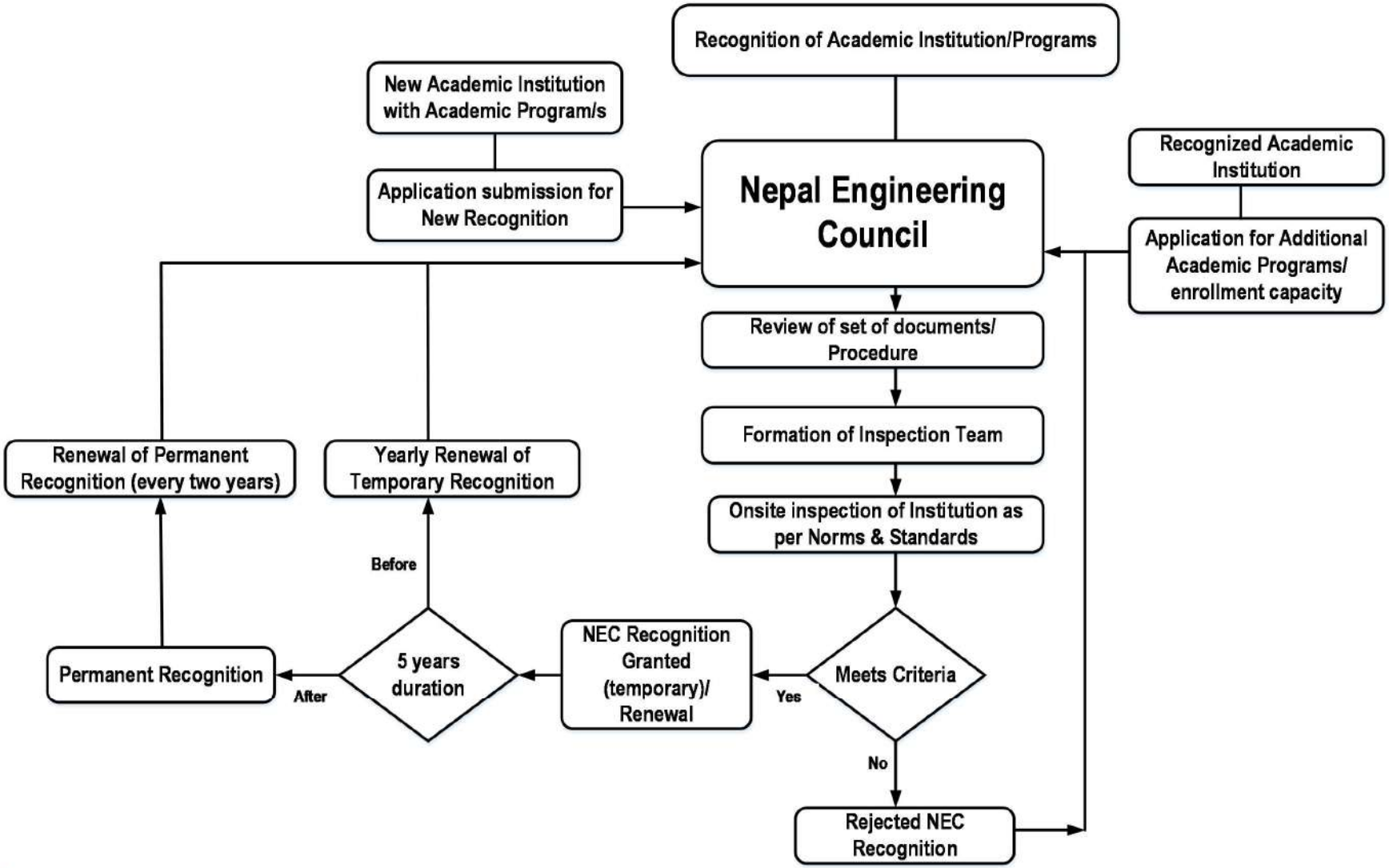
quality. The information from the one person could be confirmed by asking with another person of the same college.

- Public Interest: the team should prioritize the public interest and the well-being of students during the quality review process. The ultimate goal is to ensure that colleges provide a high-quality education and contribute positively to society.

By incorporating these principles into the professional ethics and code of conduct for quality review, the evaluation process becomes a more reliable and trustworthy mechanism for assessing the performance and standards of colleges.

6. RECOGNITION STAGES AND PROCEDURE

Academic Institutions shall get recognition as per the prevailing bylaws of NEC. Academic programs initiated by two or more institutions on the collaborative approach are also recognized on the similar assessment criteria as mentioned in these guidelines. The general procedure and stages of the recognition are shown in the chart below.


Recognition of Academic Institution/Programs
New Academic Institution with Academic Program/s
Application submission for New Recognition
Nepal Engineering Council
Recognized Academic Institution
Application for Additional Academic Programs/ enrollment capacity
Review of set of documents/ Procedure
Formation of Inspection Team
Onsite inspection of Institution as per Norms & Standards
Meets Criteria
Yes
No
Rejected NEC Recognition
NEC Recognition Granted (temporary)/ Renewal
5 years duration
Before
After
Yearly Renewal of Temporary Recognition
Renewal of Permanent Recognition (every two years)
Permanent Recognition

7. CONTENT OF THE INSPECTION/MONITORING REPORT

The College inspection or monitoring report shall contain the following topics:

1. Cover Page
2. Executive Summary
3. Introduction
    a. College Introduction
    b. Program/s Introduction
    c. Executive team of the College
        i) Chairperson
        ii) Principal
        iii) HoD/s
        iv) Contact Person
4. Objectives:
    a. Approval for New College
    b. Regular Monitoring
    c. Additional Program/s
    d. Additional intake capacity
5. Chronology of Inspection/Monitoring

    5.1 Present Inspection/Monitoring

    a. Date of Team Formation :
    b. Date of field visit :
    c. Date of opening meeting in the college :
    d. Date of Closing meeting in the college :
    e. Date of submission of Report :
    f. Total Score Achieved

-

    5.2 Previous Inspection/Monitoring

S/N	Date of Team Formation	Team Members	Date of field visit	Date of Report Submission	Total Score Achieved	Remarks

6. Assessment of College

- 6.1 Institutional Policy, Governance and Leadership
- 6.2 Curriculum Management and Teaching Learning Process
- 6.3 Research, Knowledge generation and Extension
- 6.4 Physical Resources
- 6.5 Human Resources
- 6.6 Students' Welfare and Support Services

7. Summary with findings
8. Comments/Recommendations and signed by team members.
9. Appendix of the Report:

    a. Minutes of meetings

    b. Documents supporting the conditions mentioned in criterion

    c. Other required Documents asked by the team