OUTCOME BASED EDUCATION MANUAL

SILICON UNIVERSITY ODISHA

Contents

Preface

Silicon University adopts Outcome-Based Education (OBE) in alignment with National Board of Accreditation (NBA) guidelines to ensure quality, relevance, and accountability in higher education. This manual provides a structured framework for defining and mapping Program Educational Objectives (PEOs), Program Outcomes (POs), and Course Outcomes (COs), and for aligning curriculum, teaching, and assessment with these outcomes.

It outlines processes for outcome measurement using direct and indirect tools, stakeholder involvement, and continuous improvement based on data-driven evaluation. The document serves as a practical guide for faculty and administrators to implement OBE effectively and to foster a learner-centric environment focused on competence, ethics, and lifelong learning.

The University remains committed to maintaining high academic standards and achieving excellence in education through the effective implementation of Outcome-Based Education. It is hoped that this manual will serve as a valuable resource in guiding all stakeholders toward achieving these goals.

1 Introduction

Outcome-Based Education (OBE) is an educational approach that focuses on the attainment of clearly defined learning outcomes, ensuring that students acquire the knowledge, skills, and attitudes necessary for professional and societal contributions. It shifts the emphasis from traditional content-based teaching to a learner-centric model where outcomes drive curriculum design, instructional methods, and assessment practices.

In alignment with the guidelines of the National Board of Accreditation (NBA), Silicon University has adopted OBE to enhance the quality and effectiveness of its academic programs. The framework involves the systematic formulation of Program Educational Objectives (PEOs), Program Outcomes (POs), and Course Outcomes (COs), along with their mapping and evaluation to measure the extent of outcome attainment.

This manual presents the structured processes and methodologies for implementing OBE across the University. It emphasizes outcome definition, curriculum alignment, assessment strategies, and continuous improvement through data analysis and stakeholder feedback. The objective is to ensure that graduates from the university are well-prepared to meet industry expectations, pursue higher education, and contribute responsibly to society.

The document is intended to guide faculty members and academic administrators of Silicon University in effectively adopting OBE practices and maintaining consistency with NBA accreditation requirements. Outcome-Based Education (OBE) is a systematic approach to education that focuses on the achievement of specific, measurable learning outcomes. In alignment with the guidelines of the National Board of Accreditation (NBA), OBE emphasizes what students are expected to know and be able to do by the end of a course or program, rather than solely on the content delivered during the instructional process.

Under the NBA framework, OBE at Silicon University integrates curriculum design, instructional strategies, and assessment methods into a cohesive system known as constructive alignment. This ensures that learning activities and evaluation techniques are directly aligned with the intended outcomes, thereby enabling accurate measurement of student performance and attainment levels.Furthermore, OBE promotes a learner-centric environment that encourages active participation, critical thinking, problem-solving, and lifelong learning skills. It also incorporates both direct and indirect assessment tools, enabling institutions to gather meaningful data for evaluating outcome attainment .

This manual aims to provide a clear understanding of OBE principles and their practical implementation in accordance with NBA accreditation requirements. It serves as a foundational guide for faculty and academic administrators of the university to design, deliver, assess, and continuously improve academic programs, ultimately ensuring the development of competent and socially responsible graduates.

2 Outcome Based Education(OBE)

2.1 History of OBE

William G. Spady, an academic and an educational psychologist framed the term “Outcome Based Education” in 1988 which is an extension of the works completed by John Franklin Bobbitt and Ralph W. Tyler. Bobbitt’s efforts were towards improving the curriculum so as to adapt

to the needs of an individual and to the needs of the new industrial society. He expressed his thoughts through a book "The Curriculum: A Summary of the Development Concerning the Theory of the Curriculum".

Tyler was an American educator who worked in the field of assessment and evaluation. OBE is referred to by different names like Systemic Education Restructuring (SER), Performance Based Education (PBE), Standards Based Education Reform (SBER), High Performance Learning (HPL), Total Quality Management (TQM), Transformational Education (TE), and Competency Based Education (CBE) to name a few. OBE methods have been adopted and applied throughout the world in different paradigms.

In an international effort to accept OBE, the Washington Accord was created in 1989 which is a multi-lateral agreement between bodies responsible for accreditation or recognition of tertiary-level engineering qualifications within their jurisdictions that have chosen to work collectively to assist the mobility of professional engineers.

2.2 Definition of OBE

OBE can be defined as a student-centric teaching–learning educational theory that is based on the reorientation in educational system towards what is essential for all students to be successful at the end of their learning experiences. OBE is grounded on the fact that each part of the educational system revolves around goals which are termed as "outcomes". OBE can also be defined as clearly focusing and organizing the curriculum, instruction and assessment to fulfill the learning goals. OBE works on four levels of outcomes:

1. Course Outcomes (COs)
2. Program Outcomes (POs)
3. Program Specific Outcomes (PSOs)
4. Program Educational Objectives (PEOs)

2.3 Features of OBE

Outcome based education revolves around four principles which are known as OBE's Power Principles as stated by W. G. Spady in his book "Outcomes Based Education: Critical Issues and Answers". These principles are:

1. Clarity of Focus: A clear picture of learning is to be drawn so that all curriculum design, all instructional delivery, and all assessment design is geared to what we want the students to demonstrate successfully at the "real" end.
2. Expanded Opportunity: It has five key dimensions namely: Time, Methods and Modalities, Operating Principles, Performance Standards and Curriculum access and structuring. All of these five dimensions relate to expanding the ways and number of times the students get a chance to learn and demonstrate, at a very high level, whatever they are ultimately expected to learn.
3. High Expectations: It has three key dimensions, namely, Raising the standards of acceptable performance, eliminating success quotas, and increasing access to high level curriculum. It summarizes the elimination of the bell curve standards, expectations, and results which in turn will provide higher student achievement in more challenging field of learning.
4. Design Down: It means building the curriculum and instructional planning design back from the point where we want the students to ultimately end up. It can be made powerful if the outcomes are categorized as culminating, enabling and discrete, as defined below:

(a) Culminating outcomes define what the system wants all students to be able to do when their official learning experiences are complete.

(b) Enabling outcomes are the critical components or building blocks of learning to reach the culminating outcomes.

(c) Discrete outcomes are parts of the curriculum which are not essential but are "nice to know".

2.4 Benefits of OBE

Traditional education system is highly dependent on theoretical aspects of learning. It repeats the monotonous way of teaching-learning process that just focuses on memorizing skills of students rather than skill development.

It hardly provides any chance for students to develop new skills which might be useful for building their careers. In a traditional system, teachers are more focused on completing the curriculum with the given time frame rather than innovating.

Outcome Based Education system provides expanded opportunities for the students by following a student-centered learning approach. It has a clear goal to impact their lives positively, committing to excellence & innovation.

1. Purpose and Direction: The purpose and direction is clearly defined through a process of strategic design in which establishment of a clear mission and vision, a framework of values and principles that guide decision making, a framework of exit outcomes that guide program design and priorities, and a plan for allocating resources and using staff that is consistent with the defined mission, vision, values, and exit outcomes are formed.This process translates directly into the classroom through the clarity of focus and design down principles.

2. Flexibility: The method of instruction is not specified in OBE. This helps the instructors to identify the diversity among the students and then prepare various teaching and assessment techniques to facilitate the learning of the students. There is a much clearer rationale for, and more consistency in, all policy and programmatic decisions that are made. The four principles serve as powerful guides for both decision making and action in the short term and longer run.

3. Increased Motivation and Morale: Students are motivated for self-learning which helps them to achieve a full understanding of the materials. This results in a significant shift in organizational climate with a heightened expectation for greater success.

4. Improved Community Relations: Relation between the institution and stakeholders is improved as parents and community members are asked to give input in order to uphold the standards of education and to ensure that students will be prepared for life after successful completion of the program. This will ensure continuous quality improvement

The other benefits of OBE as defined by various authors are:

1. OBE embodies the commonsense thinking and practice of effective instructional design and delivery found in highly effective learning systems throughout our society.

2. Outcome-based models respond to a clear need in our society for learning systems that promote rather than constrain the learning opportunities of all students; they all will need to be prepared for the continuous learning and improvement challenges of the Information Age labor market.

3. The transformation of our society from Industrial Age to Information Age realities and needs has fundamentally affected the nature of work and employment opportunities. Competence in information processing and data handling is already essential in most jobs today.

4. OBE has strong parallels with the "quality revolution" taking place throughout the business world.

5. OBE is geared to providing concrete, useful information to parents, employers, and colleges regarding the actual performance abilities of students and the improved effectiveness of the system all within reasonable and responsible

3 OBE Framework of NBA

3.1 Vision of NBA

To be an accrediting agency of international standard by ensuring the highest degree of credibility in assurance of quality and relevance to professional education and come up to the expectations of its stakeholder's viz., academicians, corporates, educational institutions, government, industry, regulators, students and their parents.

3.2 Mission of NBA

To stimulate the quality of teaching, self-evaluation and accountability in the higher education system, which help institutions realize their academic objectives and adopt teaching practices that enable them to produce high-quality professionals and to assess and accredit the programs offered by the institutions imparting technical and professional education.

3.3 Objectives of NBA

Major objectives of the NBA are as follows:

- To assess and accredit the technical education programs;
- To evolve standards and parameters for assessment and accreditation in line with the parameters laid down by the appropriate statutory regulatory authority for co-ordination, determination and regulation of standards in the concerned field of technical education;
- To promote excellence through a benchmarking process, which is helpful in determining whether or not an institution is able to achieve its mission and broad based goals, and in interpreting the results of the outcomes assessment process;
- To promote quality conscious system of technical education where excellence, relevance to market needs and participation by all stakeholders are prime and major determinants.
- To build a technical education system as facilitator of human resources, that will match the national goals of growth by competence, contribution to economy through competitiveness and compatibility with societal development;
- To set the quality benchmarks targeted at global and national stockpile of human capital in all fields of technical education;
- To conduct evaluation of self-assessment of technical institutions and/or programs offered by them on the basis of guidelines, norms and standards specified by it; and
- To contribute to the domain of knowledge in quality parameters, assessment and evaluation.

4 About Silicon

Silicon Institute of Technology, Bhubaneswar, was established in the year 2001 under a duly registered Trust with an objective to provide high quality technical education having significant humanistic aspects. Over the past two decades, Silicon Institute of Technology has earned the reputation for being a premier engineering institute, and placed itself prominently in the academic map of India. It is renowned to be one of the premier centers for technological educational institute in Odisha, with an established track record over the last decade. Silicon Institute of Technology, Bhubaneswar becomes an Autonomous Institute after being conferred academic autonomy by UGC in 2018. **Silicon Institute of Technolgy conferred with University status by an act of the Odisha legislative assmbly on 30th january 2024.**Academic programs of Silicon are in line with the All-India Council for Technical Education (AICTE), Ministry of Human Resource Development (MHRD) and UGC.

4.1 Vision and Mission

Vision is a futuristic statement of the kind of environment an organization aspires to create within a broad time horizon and develop the underlying conditions for achieving of this. Mission statement states the purpose and identity of the organization and defines the institution's values and philosophy to move towards the stated vision.

Silicon University has framed its Mission and Vision keeping in view the core organizational goals, its long-term objectives and the practical commitments and actions that the university believes are needed to achieve its vision.

4.1.1 Vision Statement

"To become a centre of excellence in the fields of technical education and research and create responsible citizens".

4.1.2 Vision Elements

The Vision statement of the University has the following elements embedded into it:

1. **Teaching and Learning:** Teaching and Learning are central to all. Silicon University continually strives to acquire, apply and impart knowledge. This means that the old model of teaching being active, learning being passive and faculty transferring knowledge to students, gives way to a conducive learning environment. Silicon University believes in what Thiruvaluvar said long back: "One's learning alone is one's indestructible and outstanding wealth, nothing else possess this special character".

2. **Learning Centered:** Silicon University strives to become a fully committed learning organization where all constituents are partners in learning. Learning becomes an active endeavour and focuses on learning outcomes. The thrust is on assessing what has been learnt and using those assessments to improve the learning process. Decisions are guided by the question "How will this improve learning?" It is a continuous process.

3. **Excellence:** The University focuses on setting high standards and strives to achieve them. Silicon University continually assesses and evaluates all aspects of the university, identifies the gap and uses the experience learned to bridge the gaps so as to nurture an environment of excellence throughout.

4. **Discovery:** Silicon University promotes learning for all of its constituents by maintaining and supporting a culture of inquiry and creativity based on the tenet of academic freedom. In other words, the experience gained by applying the learning's is used to convert the

tacit knowledge into implicit knowledge. The wisdom acquired is used to solve problems and enhance the existing knowledge base. The students as well as teachers are equally motivated in this endeavor.

4.1.3 Mission statement

““To provide the best of technical skills, professional ethics and human values in enriching the disciplines of Science, Engineering and Technology for social development and Nation building”.

4.1.4 Quality policy

Silicon University is committed to pursue global standards of excellence in all its endeavours namely teaching, research, consultancy and continuing education through processes of self-evaluation and continuous improvement.

The Internal Quality Assurance Cell (IQAC) of the university continuously monitors the Quality enhancement and works towards the realization of goals of Quality enhancement and sustenance.

We are committed to offer best academic services to our Learners through continuous innovative practices by developing a team of highly qualified and motivated Lecturers, providing state-of-the-art Laboratories and having excellent Library facilities and ensuring its utilization.

4.1.5 Process of Establishment

Establishing the Vision and Mission of the University is a multi-step process.

- Step 1: A core committee is formed to identify and formulate the Mission and Vision of the University comprising of the Principal, all Deans, and Senior Professors.
- Step 2: The committee conducts stakeholder consultation and gathers insights through surveys and brainstorming sessions.Suggestions are collected through discussions with internal and external stakeholders through various platforms like during alumni meetings, recruitment drives, industry institute interactions, parents-teachers' meetings, etc. The graduate attribute guidelines designed by NBA are also taken into consideration.
- Step 3: A draft mission and vision statement is formed by collecting the views and feedback from the various stakeholders like students, faculties and staff members, industry experts, professional bodies etc.
- Step 4: The collected suggestions are reviewed, analysed and converged by the team members through brainstorming sessions and the customized Vision and Mission Statements of the university are formulated.
- Step 5: The committee also considers the graduate attributes and guidelines of statutory bodies to prepare the draft version.
- Step 6: The customized Vision and Mission Statements are presented to the Board of Governors (BoG) for approval.
- Step 7: The approved Vision and Mission Statements are published and disseminated.

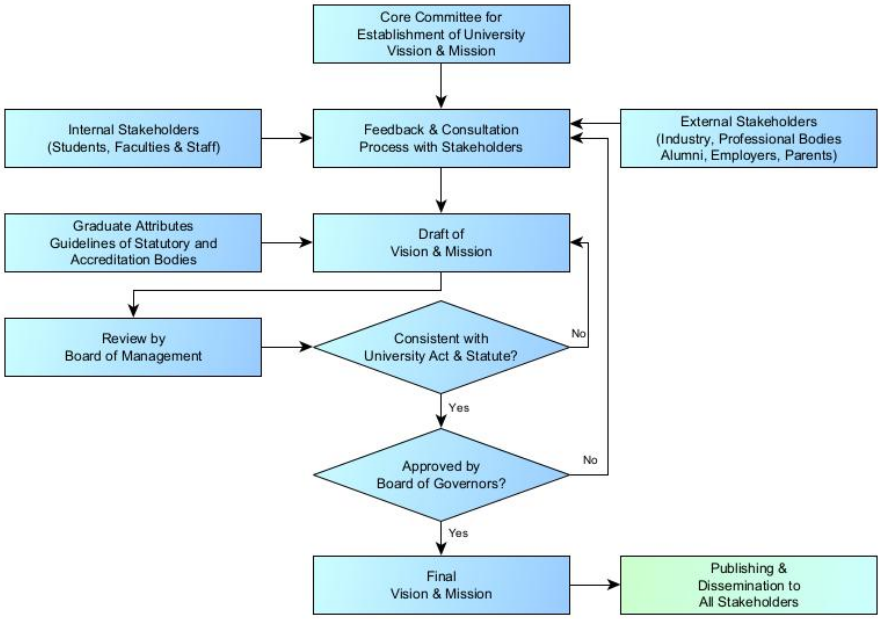

Figure 1: Block diagram for establishment of University mission & Vision

4.1.6 Publishing and Dissemination

The Vision and Mission of the university needs to be published and disseminated to all stakeholders so that all are equally aware. The various modes of publishing the Vision and Mission are as under:

1. University Website (www.silicon.ac.in)
2. Academic Calendar
3. University Brochure
4. University's Technical Magazines
5. University's Academic Diary
6. Administrative Notice Board
7. Notice Board of all Departments
8. Notice Board of all residence
9. University Placement Brochure
10. Curriculum Book
11. First Year Orientation Program

Similarly, the various modes of disseminating the Vision and Mission are as under:

1. Conferences
2. Students Orientation

3. University Programs
4. Parent Teacher Meetings
5. Alumni Meetings
6. Association Activities
7. Students Prologue
8. HR Conclaves

4.2 Statutory Committees

The statutory committees of Silicon University are the organs of governance of the institute which facilitate the successful accomplishment of its mission and goals, look after the administrative and academic procedures as per the norms stipulated by AICTE and UGC.

4.2.1 Board of Governors

The Board of Governors is the principal executive body and principal governing body of the university which will determine and frame general policies to offer transparent and effective governance in building and developing university in alignment with its long term vision and objectives associated with it.

Composition: The composition of Board of Governors has internal as well as some eminent external experts well known in their chosen domain of expertise. The composition of the Board of Governors is as follows:

- The Chairman of the University who shall be the Chairman of the Board of Governors
- The Vice-Chairman of the University
- The Vice-Chancellor of the University
- The Registrar of the University who shall be the ex-officio Secretary of the Board of Governors
- Five persons to be nominated by the Board of Trust who shall be eminent scholars, educationists, industrialists, technologists, artists, doctors, public servants or persons of repute
- Two experts nominated by the State Government
- One members of the Odisha Legislative Assembly nominated by the Speaker in consultation with the leader of the House and the leader of opposition
- The Secretary to Government, Skill Development and Technical Education Department, who shall be the member ex-officio
- Two Deans of the University by rotation, to be nominated by the Chairman
- One expert of Finance to be nominated by the Chairman

Roles & Responsibilities: Being the principal body of Governance of the University, The Board of Governors has the following roles and responsibilities:

- To provide general superintendence and policy directions and to control functioning of the University by using all such powers as provided by the statutes, regulations or rules made thereunder.

- To review the policies and programmes of the University and suggest appropriate measures for effecting improvements and overall development of the University.
- To make new or additional Statutes, Ordinances and Rules or amend or repeal the earlier Statutes, Ordinances and Rules in accordance to the provisions of Sections 31 to 34 of the Act.
- To review decisions of other authorities of the University and modify or revoke the same if they are not in conformity with the provisions of the Act or the Statutes or Ordinances or the Rules made thereunder.
- To appoint the Statutory Auditors of the University.
- To consider the Annual Report and the Annual Accounts together with the Audited Reports of the University.
- To consider and approve the Annual and/or Supplementary Budget of the University and render general advice on deployment and utilization of the funds.
- To confirm the actions of the Board of Management for conferment of Honorary Degrees and other Academic Distinctions as per provisions of sub-section (1) of Section 36 of these Statutes.
- To examine, consider and approve other proposals and recommendations of the Board of Management of the University with or without modification
- To advise on matters referred by the Board of Management, Vice-Chancellor or other authorities of the University
- To advise on matters related to admission of students, existing and new courses of study and the fees thereof, the qualifications and requirements for the award of degrees, diplomas, certificates and other academic distinctions
- To review the advice of the Visitor to the Chairman or Vice-Chairman, issued under sub-section (3) of Section 12 of the Act, and compliance thereof
- To review the actions of the Vice-Chairman with respect to sub-section(4) of Section 15 of the Act;
- Consider suo motu or on reference by other officers or authorities of the University any matter and recommend for such actions as it may deem necessary
- To recommend to the Sponsoring body for voluntary liquidation of the University if such a situation arises making it impossible to continue smooth functioning of the University
- To take such decisions and perform such functions as deemed necessary in accordance to the objectives and powers of the University under the provisions of Sections 7 and 8 of the Act respectively. To provide general superintendence and policy directions and to control functioning of the University by using all such powers as provided by the statutes, regulations or rules made there-under.
- To review the policies and programmes of the University and suggest appropriate measures for effecting improvements and overall development of the University.
- To make new or additional Statutes, Ordinances and Rules or amend or repeal the earlier Statutes, Ordinances and Rules in accordance to the provisions of Sections 31 to 34 of the Act.

- To review decisions of other authorities of the University and modify or revoke the same if they are not in conformity with the provisions of the Act or the Statutes or Ordinances or the Rules made thereunder.
- To appoint the Statutory Auditors of the University.
- To consider the Annual Report and the Annual Accounts together with the Audited Reports of the University.
- To consider and approve the Annual and/or Supplementary Budget of the University and render general advice on deployment and utilization of the funds.
- To confirm the actions of the Board of Management for conferment of Honorary Degrees and other Academic Distinctions as per provisions of sub-section (1) of Section 36 of these Statutes.
- To examine, consider and approve other proposals and recommendations of the Board of Management of the University with or without modification
- To advise on matters referred by the Board of Management, Vice-Chancellor or other authorities of the University
- To advise on matters related to admission of students, existing and new courses of study and the fees thereof, the qualifications and requirements for the award of degrees, diplomas, certificates and other academic distinctions
- To review the advice of the Visitor to the Chairman or Vice-Chairman, issued under sub-section (3) of Section 12 of the Act, and compliance there of
- To review the actions of the Vice-Chairman with respect to sub-section(4) of Section 15 of the Act;
- Consider suo motu or on reference by other officers or authorities of the University any matter and recommend for such actions as it may deem necessary
- To recommend to the Sponsoring body for voluntary liquidation of the University if such a situation arises making it impossible to continue smooth functioning of the University
- To take such decisions and perform such functions as deemed necessary in accordance to the objectives and powers of the University under the provisions of Sections 7 and 8 of the Act respectively. To provide general superintendence and policy directions and to control functioning of the University by using all such powers as provided by the statutes, regulations or rules made there-under.
- To review the policies and programmes of the University and suggest appropriate measures for effecting improvements and overall development of the University.
- To make new or additional Statutes, Ordinances and Rules or amend or repeal the earlier Statutes, Ordinances and Rules in accordance to the provisions of Sections 31 to 34 of the Act.
- To review decisions of other authorities of the University and modify or revoke the same if they are not in conformity with the provisions of the Act or the Statutes or Ordinances or the Rules made thereunder.
- To appoint the Statutory Auditors of the University. –

- To consider the Annual Report and the Annual Accounts together with the Audited Reports of the University.
- To consider and approve the Annual and/or Supplementary Budget of the University and render general advice on deployment and utilization of the funds.
- To confirm the actions of the Board of Management for conferment of Honorary Degrees and other Academic Distinctions as per provisions of sub-section (1) of Section 36 of these Statutes.
- To examine, consider and approve other proposals and recommendations of the Board of Management of the University with or without modification
- To advise on matters referred by the Board of Management, Vice-Chancellor or other authorities of the University
- To advise on matters related to admission of students, existing and new courses of study and the fees thereof, the qualifications and requirements for the award of degrees, diplomas, certificates and other academic distinctions
- To review the advice of the Visitor to the Chairman or Vice-Chairman, issued under sub-section (3) of Section 12 of the Act, and compliance thereof
- To review the actions of the Vice-Chairman with respect to sub-section(4) of Section 15 of the Act;
- Consider suo motu or on reference by other officers or authorities of the University any matter and recommend for such actions as it may deem necessary
- To recommend to the Sponsoring body for voluntary liquidation of the University if such a situation arises making it impossible to continue smooth functioning of the University
- To take such decisions and perform such functions as deemed necessary in accordance to the objectives and powers of the University under the provisions of Sections 7 and 8 of the Act respectively.

4.2.2 Board of Management

The Board of Management shall be an executive body reporting to the Board of Governors of the University, primarily looks into implementation of the general policies and procedures laid down by the Board of Governors and the operational aspects in accordance to the objectives of the University. It will determine, frame, amend or repeal different rules and regulations in accordance to the policies laid down by the Board of Governors for transparent and effective governance of various activities based on the recommendations of other officers, authorities and committees of the University.
Composition: The Board of Management is composed of the following members:

- The Vice-Chancellor of the University who shall be the ex-officio Chairman;
- The Registrar of the University who shall be the ex-officio Secretary;
- The Finance Officer of the University
- Two Members of the Board of Governors to be nominated by the Sponsoring Body; Three Deans of the University to be nominated by the Vice-Chancellor;
- Two Professors of the University to be nominated by the Vice-Chancellor;

- Such other members as may be prescribed by the Board of Governors.

The Board of Management shall meet at least eight times a year. Other administrative and/or academic heads may be invited depending on the agenda of the meeting.

Roles & Responsibilities:

- To implement the general policies and procedures laid down by the Board of Governors and look into their implementation in the operational aspects of the University;
- To determine, frame and recommend new policies or amend or repeal of existing policies for different activities of the University for effecting improvements in operational efficiency;
- To determine, frame and recommend the Board of Governors in regard to establishment of new departments or centres in the University for offering new programmes and/or courses of studies by the University;
- To examine and frame policies related to admission of students to various courses of study and the fees thereof and requirements for the award of degrees, diplomas, certificates or other academic distinctions;
- To examine and approve the proposals of the Academic Council for conferment of Honorary Degrees and other Academic Distinctions and obtain confirmation of the Board of Governors before conferment of the same;
- To examine the recommendation of the Finance Committee in regard to various fees and caution moneys in accordance to the norms and guidelines prescribed by the Regulatory Bodies;
- To determine, plan and recommend creation or up gradation of infrastructure, laboratories, equipment and other facilities of the University;
- To determine, frame and recommend new policies or amend or repeal of existing policies for different welfare schemes for employees and students of the University;
- To advise actions for improvement of standards of teaching, examinations, research, extension and other academic matters of the University that as and when necessary;
- To examine the requirement of teachers, non-teaching technical staff, and other non technical or support staff in different Schools, Departments or Centres and approve the criteria and selection process for the same;
- To exercise a closer supervision and control on regular functioning of various curricular, co-curricular, extra-curricular, and extension activities of the University;
- To exercise a closer supervision and control on various financial aspects and operations of the University and maintenance of proper financial discipline as per the Law and Government directives;
- To scrutinize, review and recommend for the Annual and/or Supplementary Budget of the University to the Board of Governors for approval;
- To examine and recommend the Annual Report, Action Taken Report and Audit Reports to the Board of Governors;
- To approve the Holiday List of the University to be recommended by the Vice-Chancellor;
- To establish and maintain cohesiveness, transparency, uniformity and effectiveness in implementation of the policies and smooth functioning of the University;

- To resolve any conflict inter-se between the officers, authorities, committees or cells of the University and ensure proper coordination between them;
- To consider suo motu or on reference by other officers or authorities of the University any matter and take such decisions or recommend for such actions as it may deem necessary;
- To exercise such other powers and perform such other functions as prescribed by the Board of Governors from time to time;

4.2.3 Academic Council

The Academic Council will be solely responsible for all academic matters, such as, framing of academic policies, approval of courses, regulations, syllabi, etc. The Academic Council shall propose ways and means to maintain quality norms in education, research, examinations and award of degrees within the University which shall come into force from the date the Board of Governors may direct.
Composition: The Academic Council is consisting of following members.

- The Vice-Chancellor of the University who shall be the ex-officio Chairman;
- The Registrar of the University who shall be the ex-officio Secretary;
- Director of each constituent institute of the University;
- - The Controller of Examinations of the University;
- The Dean (Instruction) of the University;
- All other Deans of the University;
- All Heads of Departments and Centres of the University;
- Three Professors of the University to be nominated by the Vice-Chancellor;
- Four external educationalists of repute, not below the rank of Professor from outside the University, to be nominated by the Chairman;
- One member from the Industry, with not less than ten years of experience, to be nominated by the Vice-Chancellor;
- One alumni member, preferably with Ph.D., to be nominated by Vice-Chancellor;
- Up to two student members in each Academic Year based on their academic performance from UG and PG programmes of the University, preferably one boy and one girl, to be co-opted by the Vice-Chancellor;
- Such other person(s) nominated by the Chairman

Roles & Responsibilities: The Academic Council is authorized to perform following responsibilities.

- To determine the courses of studies or programmes to be offered by the University and recommend the same to the Board of Management;
- To recommend the requirements for programmes or courses of study leading to the award of degrees, diplomas, certificates and other academic distinctions to be offered by the University;

- To recommend new programmes or courses of study to be introduced keeping in view the advancements in technology and the needs of the industry;
- To determine and prescribe the qualifications for admission of students to various courses of studies and to research degrees and to the examinations and conditions under which exemptions may be granted;
- To formulate and prescribe the academic policies, guidelines, rules and regulations in regard to all courses of studies offered by the University, to amend or repeal the same and to take decisions on all academic matters thereon commensurate to the norms of Government and/or Regulatory Bodies as applicable;
- To scrutinize and approve the proposals with or without modification of the Boards of Studies with regard to the courses of study, curricula and syllabi and/or revisions thereof, instructional and examination arrangements, methods and procedures relevant thereto, provided that wherever the Academic Council differs on any proposal, it shall have the right to return the matter to the Board of Studies for reconsideration or reject the same with reasons thereof;
- To conduct review of courses and programmes offered, structure and contents of curricula and syllabi and recommend modifications thereto for effecting improvement in quality of education and employment opportunities;
- To determine the policies, guidelines, rules and regulations for scholarships, studentships, research assistantships or fellowships, and such aids to be granted by the University and recommend the same to the Board of Management for approval;
- To approve the Annual Academic Calendar of the University and modification to the same due to unforeseen circumstances if any;
- To recognize, subject to the approval of the Board of Management, the examinations of other recognized universities equivalent to the corresponding examinations of the University through the recommendation of an Equivalence Committee constituted by the Vice-Chancellor;
- To approve the results of examinations recommended by the Conducting Board and analyze and interpret the performance of students and suggest modifications to the methods and procedures of examinations and/or evaluation wherever necessary for improvement of the same;
- To approve the list of successful candidates who have completed the prescribed requirements for the award of degrees, diplomas, certificates, medals and prizes by the University;
- To determine and propose the list of persons to the Board of Management for conferment of Honorary Degrees and other Academic Distinctions;
- To consider the annual academic reports and make suggestions thereon to the Board of Management in regard to academic activities necessary to accelerate modernization and improvement of standards of education, innovation and research;
- To consider suo motu or on reference by other officers or authorities of the University any academic matter and forward its recommendations to the Chairman for such actions as it may deem necessary; and
- To exercise such other powers and perform such other functions as may be laid down or may be required from time to time by the Board of Governors, Board of Management, or the Vice-Chancellor.

4.2.4 Board of Studies

Each department of Silicon University has a Board of Studies (BoS) that serves as a key academic governing body for curriculum design, development, and continuous improvement. The BoS ensures that the syllabus remains relevant, up to date, and aligned with industry requirements and Outcome-Based Education (OBE) principles. It comprises internal faculty members, external subject experts, and industry representatives who collectively contribute to defining and reviewing course structures, course outcomes, and assessment strategies. The Board of Studies also plays a vital role in recommending academic reforms, introducing new courses, and updating existing content to reflect emerging trends in the respective discipline, thereby ensuring academic quality and enhancing graduate attributes.

Composition: The Board of Studies is composed of the following members:

1. The Dean of the School or the Head of the Department or Centre who shall be the ex-officio Chairman;
2. All Professors of the School or Department or Centre;
3. All Emeritus or Visiting Professors and Academic or Research Advisors of the University associated with the branches of study or the School, Department or Centre;
4. Two Associate Professors of the School, Department or Centre to be nominated by the Dean (Instruction);
5. Two Assistant Professors of the School, Department or Centre having at least five years of teaching experience in the Department or University to be nominated by the Dean (Instruction) on recommendation of the Dean of School or Head of the Department or Centre;
6. Two external experts, or one external expert per discipline wherever applicable, preferably of the rank of Professor from outside the University, to be nominated by the Vice-Chancellor;
7. One external person having at least five years of experience from an Industry related to the branches of study as applicable, to be nominated by the Vice-Chancellor;
8. One student or alumni member to be nominated by the Dean (Instruction) on recommendation of the Dean of School or Head of the Department or Centre;

Roles & Responsibilities: The roles and responsibilities of the Board of Studies are the following.

1. The Boards of Studies shall function as a subordinate of the Academic Council of the University and shall be responsible for framing of curricula and syllabi and implementation of the academic processes including instruction, practicals and examination in all academic programmes offered by the University.
2. to frame the curriculum and syllabus for various courses as per the Academic Regulations keeping in view the objectives of the University and the national requirements for consideration and approval of the Academic Council;
3. to review existing curricula and syllabi of various courses and suggest revisions to the same based on advancements in technology and current and/or future needs of the industry for effecting excellence in education by the University;

4. to examine any proposal for introduction of any new programmes or interdisciplinary courses for the award of a degree, diploma or certificate and frame the eligibility criteria for admission of students and methods of conduction of admission tests as applicable for consideration of the Academic Council;

5. to review and suggest methodologies and improvements in teaching-learning processes in regard to lectures, laboratory practices, examination and assessment techniques for consideration of the Academic Council;

6. to review the question papers of various examinations conducted after the previous meeting and suggest changes to the pattern, style, or standard of questions and their marks for consideration of the Academic Council;

7. to analyze, interpret and review the results of the examinations and suggest methodologies in the teaching-learning practices, question paper setting and evaluation for effecting improvement to the same;

8. to analyze, interpret and review the research activities, publications, sponsored research and consultancy projects and their outcomes by the teachers, research scholars and students of the Department, and suggest necessary actions to be taken for effecting improvements the same;

9. toreview andsuggest creation or upgradation of infrastructure, laboratories, and other facilities for effecting improvement in academic, research, extension, and outreach activities of the Department;

10. to consider suo motu or on reference by other officers or authorities of the University any academic or co-curricular matter and forward its recommendations to the Vice Chancellor for such actions as it may deem necessary; and

11. to exercise such other powers and discharge such other functions as assigned by the Academic Council or the Board of Management from time to time.

12. The meetings of the Boards of Studies shall be convened at least twice a year in the following manner:

    (a) The Head of the Department, except the first meeting of the first Board of Studies, shall inform all members of the Board of Studies by giving not less than seven days notice indicating the date, hour and venue of the meeting;

    (b) The Head of the Department shall issue a copy of the agenda set forth for the meeting and the business to be transacted thereat to every member not less than three days before the date of the meeting. However, non-receipt of the agenda by any member shall not invalidate the proceedings of the meeting;

    (c) On the requisition made in writing and signed by at least one-third of the members of the Board of Studies, the Head of the Department may convene a special meeting of the Board of Studies by giving a notice of one day;

    (d) The Head of the Department may bring forward any business, which has not been placed on the agenda, if he considers that it requires such attention and such action by the Board of Studies;

    (e) One-third of the total members of the Board of Studies, including the Head of the Department, with at least one of the external members present in the meeting shall form the quorum for a meeting of the Board of Studies;

(f) If a quorum is not formed within thirty minutes of the appointed hour of the meeting, it shall stand adjourned to some other date and hour preferably within one week, with the same agenda and the members present shall be competent to transact all the business of such adjourned meeting;

(g) It shall be competent for the Board of Studies to frame for the efficient conduct of the business or such standing orders as it may consider necessary. The Board of Studies shall have the power to modify the procedure of the meeting if it considers such modifications are necessary for the better transactions of the business;

(h) As soon as it is convenient after each meeting, the Head of the Department shall prepare the minutes of the meeting, and after approval by the Dean (Instruction), send a copy thereof to all the members; and

(i) The Board of Studies may constitute different sub-committees for looking into and assist in specific academic matters of the Department and its programmes.

13. The Board of Studies shall look into such other matters of curricular or co-curricular nature as may be directed by other officers and/or authorities of the University from time to time for effecting improvements in academic quality of the University.

4.2.5 Finance committee

The Finance Committee of Silicon University is the principal financial body of the University to take care of the financial matters and shall co-ordinate and exercise general supervision and control over the financial matters of the University, which shall come into force from the date the Board of Governors may direct.

Composition: The Finance Committee shall consist of the following members, namely:

1. The Vice-Chancellor of the University who shall be the ex-officio Chairman;
2. The Registrar of the University who shall be the ex-officio secretary;
3. The Finance Officer of the University;
4. Two members of the Board of Management to be nominated by the Chairman; and
5. Two Experts of financial matters to be nominated by the Chairman.

Roles & Responsibilities: The Finance committe is authorized to perform following responsibilities.

1. The Finance Committee shall be the custodian of the Corpus Fund, General Fund, and Development Fund of the University and shall be responsible for management of the funds strictly in accordance to the policies, norms and guidelines laid down by the University.
2. to determine and formulate the policies, guidelines, rules and regulations and processes for all financial matters of the University and make necessary revisions to the same as required with the approval of the Board of Governors;
3. to determine and recommend the fees for various courses of study including tuition fee, development fee, residential fees, examination fees in accordance with the norms and guidelines prescribed by the Regulatory Bodies and the amount of caution money to be collected by the different establishments of the University;
4. to determine and recommend the scheme for providing concession in various fees payable to the University by the students belonging to Scheduled Castes, Scheduled Tribes community, Economically Weaker Sections and Women from the State of Odisha after due verification of their Resident Certificate and Caste Certificate issued by the Government of Odisha;

5. to prepare the final draft of the Annual and/or Supplementary Budget of the University after due examination, consideration and inclusion of the proposals made by various departments, centres, offices, sections, and/or establishments and place it before the Board of Governors for approval;

6. to examine the proposal of borrowing funds and/or receiving donations or contributions from other institutions, agencies, or individuals and place its recommendations before the Board of Governors for approval;

7. to suggest ways and means of raising resources and observe economic or austerity measures for effecting a sound financial health of the University;

8. to determine the limits of the total recurring and non-recurring expenditures for each financial year based on the income and resources of the University and ensure that no expenditure is incurred in excess of the budget provisions;

9. to examine any proposal for any expenditure outside the budget provision and recommend to the Board of Governors for approval of the same with necessary justifications thereof;

10. to consider the final draft of annual accounts of the University prepared by the Finance Officer and place the same before the Board of Management along with the audit report thereon;

11. to call for such information and records from any department, office or section of the University or require their assistance for the purpose of examining and scrutinizing the annual account;

12. to examine and recommend such other proposals as may be referred to it by other officers or authorities of the University for consideration of the Board of Governors;

13. to recommend appropriate deployment of funds for the specified purposes for the objectives and greater benefits of the University;

14. towatchtheprogress of all receipts and expenditures provided in the budget and make necessary recommendations to the Board of Governors for effecting improvements in financial health of the University;

15. to prepare such reports and such recommendations to the Board of Governors as may be necessary on the various financial matters of the University;

16. to consider and advise such other matters relating to finance of the University that may be referred to it by the Board of Governors; and

17. to exercise such other powers and perform such other functions as may be laid down or may be required from time to time by the Board of Governors.

5 Departments

5.1 Adminstration and monitoring

The responsibility of overall administration and monitoring the functions of the department lies with the Head of Department (HoD). The HoD is overall in-charge for all activities for establishing an ideal learning environment for the students. The HoD is also responsible for promoting various other curricular, co-curricular, and extra-curricular activities activities of the department in order to achieve its objectives, mission, and vision, which in turn contribute to

achievement of the objectives of the institute. The HoD of a department also coordinates with the Heads of all other departments and establishments of the institute for smooth functioning of academic as well as non academic activities of their departments. The HoD organizes and monitors all activities of the department under three broad categories, namely,

- Academics,
- Beyond Academics and
- Administration.

5.2 Development activities

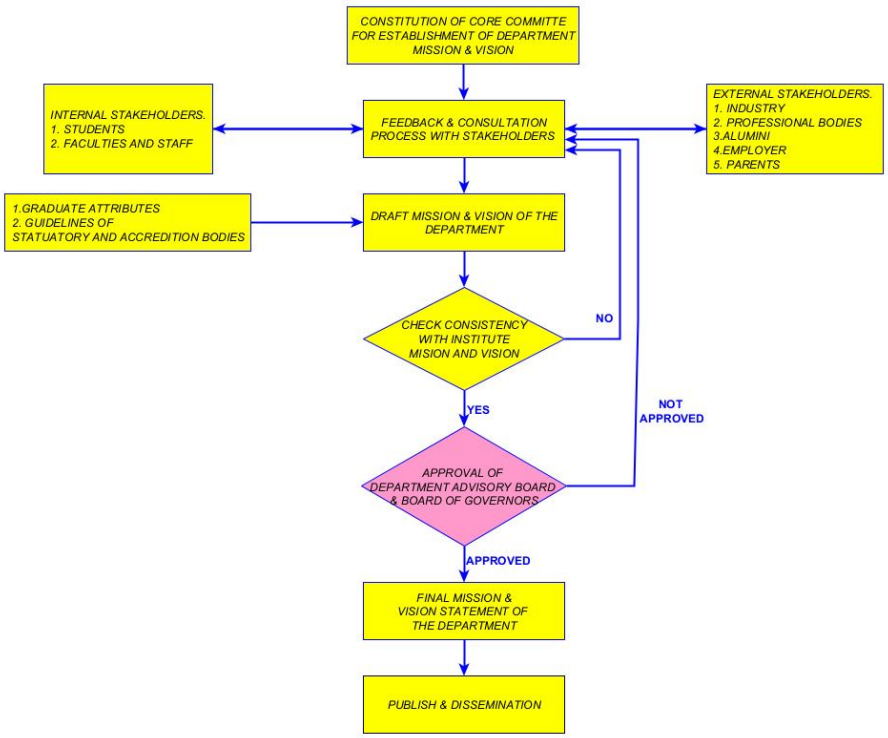

Figure 2: Block diagram for establishment of Department mission & Vision

5.2.1 Process of Department Vision & Mission Establishment

Establishing the Vision and Mission of a department is a multi-step process.
Step-1: A core committee is formed to identify and formulate the mission and vision of the Department comprising of the HOD, external representative, and Senior Professors. The core committe also have at least one mber from other department.
Step-2: The committee conducts stakeholder consultation and gathers insights through surveys and brainstorming sessions.Suggestions are collected through discussions with internal and external stakeholders through various platforms like during alumni meetings, recruitment drives, industry interactions, parents-teachers' meetings, etc. The graduate attribute guidelines designed by NBA are also taken into consideration.
Step-3: A draft mission and vision statement is formed by collecting the views and feedback

from the various stakeholders like students, faculties and staff members, industry experts, professional bodies etc.
Step-4: The collected suggestions are reviewed, analysed and converged by the team members through brainstorming sessions and the customized Vision and Mission Statements of the department are formulated.
Step-5: The committee also considers the graduate attributes and guidelines of statutory bodies to prepare the draft version. The committee checks the consistency of department mission and vision with that of the university mission and vision statements.
Step-6: The customized Vision and Mission Statements are presented to the Advisory board of the department for approval.
Step 7: The approved Vision and Mission Statements are published and disseminated.

5.3 Computer Science & Engineering

5.3.1 Vision & Mission

Vision:
To be a leading department in providing quality education and research in the field of computer science & engineering and to meet the community's needs in the field of computing.
Mission:

1. To impart fundamental engineering knowledge and to equip students with a broad set of skills and an inquisitive attitude to evolve them into leaders of tomorrow for diverse successful professional careers (Knowledge, Skill and Continuing Education)

2. To develop linkages with leading R& D organizations and educational institutions in India and abroad for excellence in teaching, research and consultancy practices (Research)

3. To inculcate ethics, cultivate a sense of commitment to others and instill a sense of appreciation for the importance of service to their professions and society to improve the lives of those around them (Ethics & Service)

5.3.2 Programs Offered

- B.Tech. Computer Science and Engineering (CSE)
- B.Tech. Computer Science and Engineering (CSE)
- B.Tech. Computer Science and Engineering (CSE)
- M.Tech. Computer Science and Engineering (CSE)
- M.Sc. (Data Science)

5.3.3 B.Tech. Computer Science and Engineering (CSE)

The B.Tech. program prepares students for long term success. Beyond building core competencies and technical know-how of students, the program fosters creative skills to thrive in a dynamic world, develops leadership and social responsibility, and cultivates lifelong learning skills.
PEO1. Fundamental Knowledge & Core Competence: To apply fundamental knowledge of mathematics, science and engineering required for a successful computer professional and inculcate competent problem solving ability using efficient algorithms.
PEO2. Proficiency for the Real World: To foster the skills and creative ability to analyze, design, test and implement cost effective software applications and digital support systems for the changing needs of the real world.

PEO3. Leadership & Social Responsibility: To exhibit leadership capability with professional, ethical, interpersonal skills, social & economic commitment with a sense of responsibility towards public policies, community services, humanity and environment.
PEO4. Life-long Learning: To grow professionally through continued education & training of technical and management skills, pursue higher studies, and engage in life-long learning.
The comprehensive curriculum helps students to:
PSO1. Understand, analyze, and develop efficient software solutions to problems of varying complexity related to algorithms, system software, multimedia, web applications, data processing, and networking by applying fundamental concepts of computer science.
PSO2. Develop the skills in different computer languages, environments, tools & platforms to become a successful software professional or entrepreneur, develop a zest for innovation & higher studies, and contribute as a responsible citizen with effective communication, strong moral values and professional ethics.
PSO3. Adapt to the evolutionary changes in computing and embrace modern practices of software development to deliver user-friendly expert systems with for business success in the real world to meet the challenges of the future.

5.4 Electrical & Electronics Engineering

5.4.1 Vision & Mission

Vision:
To be a premier and value-based department committed to develop technically and ethically competent electrical & electronics professionals to meet the challenges of the emerging trends in the technical world.
Mission:

1. Establish a learning environment with academic discipline to impart complex engineering knowledge in electrical technologies for sustained and successful professional career that will contribute to the nation building. (Knowledge and Continuing education)

2. Provide a framework for collaborative and multidisciplinary activities to promote creativeness, innovativeness and out-of-box thinking among students relating to advanced electrical technologies, improving research ability to maintain technical Proficiency in the electrical domain. (Innovations and Research)

3. To inculcate professional ethics and human values and take the mantle of responsibilities in the power engineering field by promoting group activities addressing societal needs. (Ethics and Leadership)

5.4.2 Programs Offered

- B.Tech. Electrical and Electronics Engineering (EEE)
- M.Tech. Power Engineering & Energy Systems (PE & ES)

5.4.3 B.Tech. Electrical and Electronics Engineering (EEE)

The B.Tech. program prepares students for long term success. Beyond building core competencies and technical know-how of students, the program fosters creative skills to thrive in a dynamic world, develops leadership and social responsibility, and cultivates lifelong learning skills.
PEO1. Fundamental Knowledge & Core Competence: To apply the principles of science, applied mathematics and fundamentals of electrical & electronics engineering essential for a successful professional and inculcate competent problem-solving ability.

PEO2. Proficiency for the Real World: To foster creative ability and skills required to analyze, design, test, and implement emerging technologies in electronics & power systems with economic considerations, useful in the real world.
PEO3. Leadership & Social Responsibility: To exhibit leadership capability with professional, ethical, interpersonal skills, social & economic commitment with a sense of responsibility towards public policies, community services, humanity and environment.
PEO4. Life-long Learning: To grow professionally through continued education & training of technical and management skills, pursue higher studies, and engage in life-long learning.
The comprehensive curriculum helps students to:
PSO1. Understand, analyze, formulate and solve engineering problems of varying complexity in Electrical and Electronics Engineering by implementing the fundamental principles of electrical machines, power systems, power electronics, control systems and signal processing.
PSO2. Acquire the skills in modern methodologies, tools and platforms to become a successful professional or entrepreneur, develop a passion for innovation & higher studies, and contribute as a responsible citizen with effective communication, strong moral values & professional ethics.
PSO3. Adapt to the emerging developments in electrical sciences, apply modern practices & strategies in project development using hardware & software environments to deliver quality solutions considering green energy challenges of the future.

5.5 Electronics & CommunicationEngineering

5.5.1 Vision & Mission

Vision

To be recognized as a beacon of quality education and research in the field of Electronics and Communication Engineering.
Mission

1. Continually improve the standard of our graduates by having high caliber motivated faculty members together with quality educational programs and facilities in line with the rapid technological advancements in the field of Electronics and Communication Engineering (Knowledge, Skill, and Quality)

2. Provide a balanced regime of quality education that incorporates theoretical and practical education, innovation, and creativity as well as freedom of thought and research with emphasis on professionalism and ethical behavior (Professionalism & Ethics)

3. Promote and support research activities over a broad range of academic interests among students and staff for the growth of individual knowledge and prepare for continuous learning (Research and Life-long Learning)

5.5.2 Programs Offered

- B.Tech. Electronics and Communication Engineering (ECE)
- M.Tech. Electronics and Communication Engineering (ECE)

5.5.3 B.Tech. Electronics and Communication Engineering (ECE)

The B.Tech. program prepares students for long term success. Beyond building core competencies and technical know-how of students, the program fosters creative skills to thrive in a dynamic world, develops leadership and social responsibility, and cultivates lifelong learning skills.

PEO1. Fundamental Knowledge & Core Competence: To utilize the knowledge of mathematics, science and fundamentals of electronics & communication engineering required to become a successful professional and foster complex problem solving ability.
PEO2. Proficiency for the Real World: To acquire the skills to analyze, design, develop, and optimize novel acceptable electronics and communication systems as per the growing needs of the real world.
PEO3. Leadership & Social Responsibility: To exhibit leadership capability with professional, ethical, interpersonal skills, social & economic commitment with a sense of responsibility towards public policies, community services, humanity and environment.
PEO4. Life-long Learning: To grow professionally through continued education & training of technical and management skills, pursue higher studies, and engage in life-long learning.
The comprehensive curriculum helps students to:
PSO1. Understand, analyze and apply the elementary concepts in Electronics and Communication Engineering to design, formulate and implement efficient systems in the broad areas related to signal processing, image processing, communication, VLSI and embedded systems.
PSO2. Develop the skills in modern technologies, tools & platforms to become a successful professional or entrepreneur, exhibit a passion for innovation & higher studies, and contribute as a responsible citizen with effective communication, strong moral values & professional ethics.
PSO3. Embrace various technological advancements in electronics & communication to design and create useful and competitive systems for real-world needs using modern platforms and tools to meet future challenges.

5.6 Electronics & Instrumentation Engineering

5.6.1 Vision & Mission

Vision
To be a model department with an excellent impetus for academics and research.
Mission
To educate students professionally with a strong foundation in Electronics and Instrumentation Engineering by promoting creativity and nurturing teamwork.

5.6.2 Programs Offered

- B.Tech. Electronics and Instrumentation Engineering (EIE)
- M.Sc. (VLSI)
- M.Sc. (Embedded Electronics & IIoT)

5.6.3 B.Tech. Electronics and Instrumentation Engineering (EIE)

The B.Tech. program prepares students for long term success. Beyond building core competencies and technical know-how of students, the program fosters creative skills to thrive in a dynamic world, develops leadership and social responsibility, and cultivates lifelong learning skills.
PEO1. Fundamental Knowledge & Core Competence: To apply the knowledge of science, mathematics and principles of electronics & instrumentation engineering essential for a successful professional and inculcate competent problem-solving ability.
PEO2. Proficiency for the Real World: To inculcate the skills required to analyze, formulate, design, develop, test and optimize efficient and cost-effective electronics and instrumentation systems useful in various real world scenarios.
PEO3. Leadership & Social Responsibility: To exhibit leadership capability with professional, ethical, interpersonal skills, social & economic commitment with a sense of responsibility towards

public policies, community services, humanity and environment.
PEO4. Life-long Learning: To grow professionally through continued education & training of technical and management skills, pursue higher studies, and engage in life-long learning.

The comprehensive curriculum helps students to:
PSO1. Understand, analyze, formulate, and solve various complex engineering problems related to sensors, process instrumentation, VLSI, Biomedical and Real-time Embedded Systems by applying fundamental concepts of electronics and instrumentation.
PSO2. Imbibe the skills in modern technologies, tools & platforms to become a successful professional or entrepreneur, develop a passion for innovation & higher studies, and contribute as a responsible citizen with effective communication, strong moral values & professional ethics.
PSO3. Appreciate and adapt to emerging technologies in electronics and related domains to design and create efficient systems for process automation in the real world using appropriate sensors, instruments, tools, and platforms to meet the challenges of the future.

5.7 Basic sciences & Humanities

The Basic Sciences and Humanities Department of Silicon University was established in 2001 and is supported by a team of highly qualified faculty members. The department's teaching and research activities span a broad range of disciplines, including basic sciences, humanities, and management studies, as well as interdisciplinary areas such as material science, nanomaterials, polymer chemistry, literature, and social sciences.

It is equipped with two well-developed laboratories—Engineering Graphics and Communicative English—which provide strong support for teaching, learning, and research activities. These laboratories are furnished with modern computer systems, the latest software, and leased-line internet connectivity to enhance practical learning experiences. The department also conducts seminars, symposiums, and conferences regularly to keep pace with emerging trends across various fields. In addition, audio-visual facilities such as LCD and overhead projectors are available to support effective and interactive teaching.
Basic sciences deparment plays a foundational role in Outcome-Based Education (OBE) in engineering because they provide the essential conceptual framework upon which engineering knowledge and skills are built. Subjects such as mathematics, physics, and chemistry enable students to understand core engineering principles, develop analytical thinking, and apply scientific reasoning to solve complex real-world problems.

6 OBE framework of Silicon University

Outcome Based Education (OBE) framework is implemented in Silicon University. OBE at Silicon University fulfils the University's Objective of creating professionals who are morally upright, skilled and are globally competitive. The curriculum, teaching learning strategies, and assessment tools are continuously enhanced through an evaluation process based on the defined OBE framework. The block diagram of the OBE framework at Silicon University is given below.

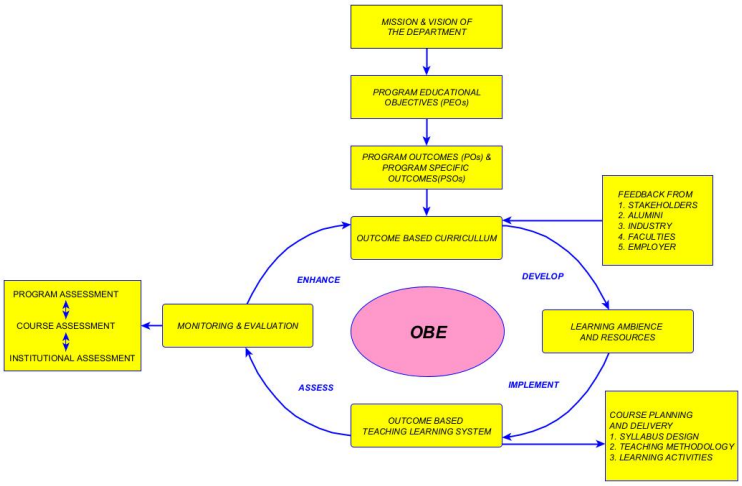

Figure 3: OBE Framework at Silicon University

7 Curriculum Design

7.1 Block diagram of curriculum Design

Designing a curriculum for a University or department is a strategic and collaborative process that ensures that the educational programs meet the needs of students, industry, and academic standards.

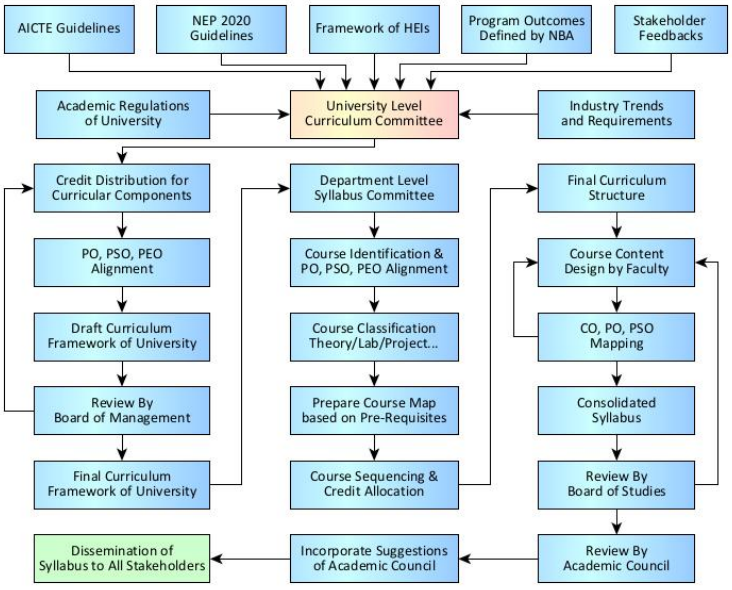

Figure 4: Block diagram of curriculum design process

7.2 Steps for curriculum design

The various steps followed are highlighted as

- The Curriculum/Program Assessment Committee reviews and evaluates the existing curriculum in relation to the program's stated objectives and goals, as well as its alignment with the department's vision and mission. It conducts a systematic analysis to ensure coherence, relevance, and academic rigor.

  Key stakeholders—including faculty, students, alumni, industry partners, and professional bodies—are consulted to gather insights into expectations and emerging requirements. Based on this feedback, clearly defined Program Outcomes are established, outlining what students are expected to know, understand, and be able to do upon completion of the program.

  The committee also ensures that the curriculum is aligned with the National Education Policy (NEP) and complies with applicable national and international accreditation standards.

- Few straight forward approach are years, semesters, and courses, including core and elective subjects in alignment with the academic calendar and degree requirements are finalised. These includes
  - Credit distribution: The credit distribution among different components of the syllabus as per requiremnet.
  - Core Courses: Required courses fundamental to the discipline.
  - Elective Courses: Optional courses allowing students to specialize in specific areas.
  - Interdisciplinary Courses: Cross-disciplinary courses that provide students with broader knowledge.
  - Practical Components: Labs, internships, projects, and industry collaborations (Practice School).
- Develop a detailed breakdown for each course, ensuring content is relevant and challenging while addressing program outcomes.
  - Course Outcomes (COs): For each course, define clear learning outcomes that describe what students will achieve by the end of the course.
  - Content Topics: Outline the topics to be covered in each course. Ensure the material progresses logically, building on foundational concepts and leading to advanced topics.
  - Teaching Methods: Identify the teaching methods (e.g., lectures, seminars, case studies, project-based learning, etc.) that align with the course's objectives.
  - Assessment Methods: Define how students will be assessed in each course. This might include exams, assignments, lab reports, projects, presentations, and peer reviews.
  - Credit Hours: Determine the number of credit hours for each course. This indicates the time and effort students are expected to invest.
- A balanced curriculum should integrate theoretical learning with practical experiences.
  - Laboratories and Practical Sessions: Ensure courses have laboratory or practical sessions where students can apply their theoretical knowledge.

  - Projects and Internships: Offer project-based learning (e.g., capstone projects) and internship opportunities with industry partners to help students gain hands-on experience.
  - Industry Collaboration: Develop partnerships with industries to offer real-world applications, guest lectures, or industry-based projects.

- After finalizing the structure, contents, credit of individual course and total credits to earn degree its sent for approval of Board of Studies. After getting the approval from BOS its put for approval of Academic Council and then implemented. The detailed flow is shown in the flowchart.
  - In addition to technical knowledge, soft skills such as communication, teamwork, leadership, and ethical considerations are crucial for students' professional success.
  - Integrate Soft Skills: Incorporate communication, teamwork, and leadership components into courses and projects.
  - Ethics and Sustainability: Ensure students are exposed to issues related to ethics, sustainability, and social responsibility, especially in fields like engineering where decisions can have far-reaching consequences.

- Ongoing assessment is essential to gauge the effectiveness of the curriculum and student progress.
  - Continuous Improvement: Implement feedback loops, where students and faculty can provide input on course content, delivery, and assessments. Use this feedback to update and refine the curriculum periodically.
  - Graduate Tracking: Monitor the success of graduates in the workforce or further studies to assess the program and it's long-term impact.
  - External Reviews: Regularly seek input from external experts or advisory boards to ensure the curriculum stays relevant to industry needs.

- After the curriculum is approved, implement it, but continue to evaluate and improve it regularly.

Regular Review: Set a schedule for periodic curriculum reviews (e.g., every 2-3 years) to ensure the program remains current and effective.
Adaptation to Emerging Trends: Continuously adapt the curriculum to emerging technologies, societal needs, and changes in the industry landscape.

8 Course Outcomes

COs are the statements of Knowledge/ Skills/ Attitude that students are expected to know, understand and perform, as a result from their learning experiences. Course Outcomes (COs) are central to the curriculum design. The course outcomes articulate to students, faculty, and other stakeholders what students will achieve in each course and how their learning will be measured.

The Course Outcomes at silicon institute of technology are stated in such a way that they can be actually measured. Each course designed to meet a number of course outcomes. The COs are mapped to at least one of the POs. When designing the COs, faculty handling the course should map their COs to the appropriate PO in order to ensure that all POs are delivered throughout the period of study.

8.1 Guidelines for writing Course Outcomes

Well written CO facilitates the faculty in measuring the achievement of the CO at the end of the semester. It also helps the faculty in designing suitable delivery and assessment methods to achieve the designed CO's. The writing of COs for outcome-based education at Silicon University follows the SMART rules were

- S – Specific: Student can state what they should be able to achieve from reading the outcomes.
- M – Measurable: Student can be able to recognize when they have achieved through the outcomes.
- A – Achievable: It is genuinely possible to complete the outcomes in the time and with the resources available.
- R – Realistic: Outcomes are appropriate for the student.
- T – Time bounded: Outcomes have a time limit for completion.

The COs are written by keeping a balance between different attributes like Knowledge, Skills and Aptitude. Course Outcome statement defined for outcome-based education at Silicon University is broken down into two main components:
1. An action word that identifies the performance to be demonstrated: A suitable action word is selected on the basis of bloom's taxonomy. The faculty assigned to prepare the detailed course select the appropriate action word suitable for the course.
2. Learning statement that specifies what learning will be demonstrated in the performance: Learning statement that specifies what learning will be demonstrated in the performance; The learning statement are defined after the selection of action words. The learning statement must reflect the expected outcome of the course. The learning statement indicates what the students expected to do or able to do after the successful completion of the course.

9 Program Outcomes

Graduates Attributes (GAs) form a set of individually assessable outcomes that are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. The Program Outcomes (POs) for UG Engineering programs defined by NBA are:
Program Outcomes (PO's)
Graduates Attributes (GAs) form a set of individually assessable outcomes that are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. The Program Outcomes (POs) for UG Engineering programs as defined by NBA are:
PO1. Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization to develop to the solution of complex engineering problems (WK1 to WK4).
PO2. Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development (WK1 to WK4).
PO3. Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required (WK5).
PO4. Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions (WK8).

PO5. Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems (WK2 and WK6).
PO6. The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment (WK1, WK5, and WK7).
PO7. Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO8. Individual & Collaborative Team Work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO9. Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.
PO10. Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO11. Life-Long Learning: Recognize the need for, and have the preparation and ability for: (i) independent and life-long learning, (ii) adaptability to new and emerging technologies, and (iii) critical thinking in the broadest context of technological change. (WK8)

Knowledge and Attitude Profile (WK's)

Knowledge and Attitude Profile (WK's) are linked to the Graduates Attributes (GAs) which indicate a graduate's potential to acquire competence at the appropriate level. NBA has defined 9 (nine) Knowledge and Attitude Profile (WK's) aligned with the Washington Accord for UG Engineering programs.
WK1. A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
WK2. Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
WK3. A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4. Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5. Knowledge, including efficient resource use, environmental impacts, whole-life cost, reuse of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
WK6. Knowledge of engineering practice(technology) in the practice areas in the engineering discipline.
WK7. Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.
WK8. Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
WK9. Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

10 Program Specific Outcomes

The process of framing Program Specific Outcomes (PSOs) for various courses is systematic and iterative, ensuring alignment with academic objectives, industry expectations, and stakeholder requirements. It begins with a comprehensive feedback and consultation phase, which plays a critical role in developing relevant, measurable, and outcome-oriented PSOs.

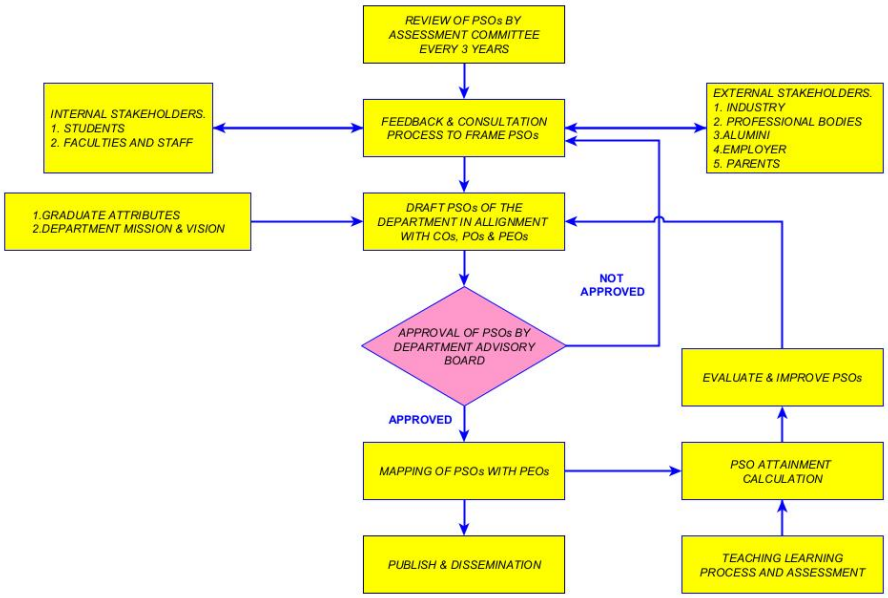

Figure 5: Block diagram for establishment of PSO

10.1 PSO Establishment Process

Step 1: Gathering Initial Feedback from Stakeholders: The process begins with the systematic collection of feedback from both internal and external stakeholders to understand the evolving needs and expectations of the program.

- Internal stakeholders—such as students, faculty members, and staff—provide insights that help identify the strengths and areas for improvement in the existing curriculum.
- External stakeholders—including industry professionals, professional bodies, alumni, employers, and parents—offer valuable perspectives on industry trends, job market demands, and the preparedness of graduates.

By incorporating these diverse perspectives, the department ensures that the PSOs remain relevant, practical, and well aligned with contemporary academic and professional standards.
Step 2: Drafting the Initial PSOs: Based on the collected feedback, the department develops a draft set of PSOs, ensuring careful alignment with key academic and programmatic components, including:

- Course Outcomes (COs) – Learning objectives specific to each course.
- Program Outcomes (POs) – The overall competencies students should achieve upon graduation.

- Program Educational Objectives (PEOs) – The long-term career and academic aspirations of graduates.

Additionally, the Graduate Attributes, along with the mission and vision of the department, are considered during this drafting phase. This ensures that the PSOs reflect both institutional goals and broader educational benchmarks.

Step 3: Review and Approval by the Department Advisory Board: Once the initial draft of the PSOs is prepared, it is submitted to the Department Advisory Board (DAB) for review and approval. The board evaluates the PSOs against key criteria, including their relevance, feasibility, and alignment with academic objectives and industry expectations.

- Upon approval, the PSOs proceed to the next stage, where they are mapped with Program Educational Objectives (PEOs). They are then formally published and disseminated to all relevant stakeholders, including students, faculty, industry partners, and accrediting bodies.
- If the draft PSOs are not approved, the board provides constructive feedback, and the department revisits the consultation process to refine and enhance the PSOs based on the suggested improvements. This revised version is then re- submitted to the board for reconsideration.

Step 4: Implementation and Annual Assessment of PSOs: Once approved, the PSOs are formally integrated into the academic framework. During each academic year, a systematic assessment of PSO attainment is conducted. This assessment evaluates the extent to which students are achieving the defined outcomes through various methods such as:

- Course assessments and student performance analysis
- Industry feedback on graduate performance
- Alumni and employer surveys

The attainment results are then analyzed to determine whether the existing PSOs are effective or if modifications are required to enhance their impact.

Step 5: Continuous Improvement and Review Process: If PSO attainment scores indicate areas for improvement, necessary modifications are made and a revised set of PSOs is developed. The updated version is then resubmitted to the Department Advisory Board for approval prior to implementation.

As part of a structured continuous improvement cycle, the PSOs are also formally reviewed every three years by an assessment committee. This periodic review ensures continued alignment with evolving educational standards, industry advancements, and stakeholder expectations. Where required, further refinements are incorporated to enhance their relevance and effectiveness.

Overall, the process of framing PSOs is dynamic, stakeholder-driven, and iterative, designed to ensure that graduates acquire the appropriate knowledge, skills, and competencies required for professional success. Through continuous feedback, systematic assessment, and regular review, the department upholds academic quality while remaining responsive to changing academic and industry landscapes.

11 Program Educational Objectives

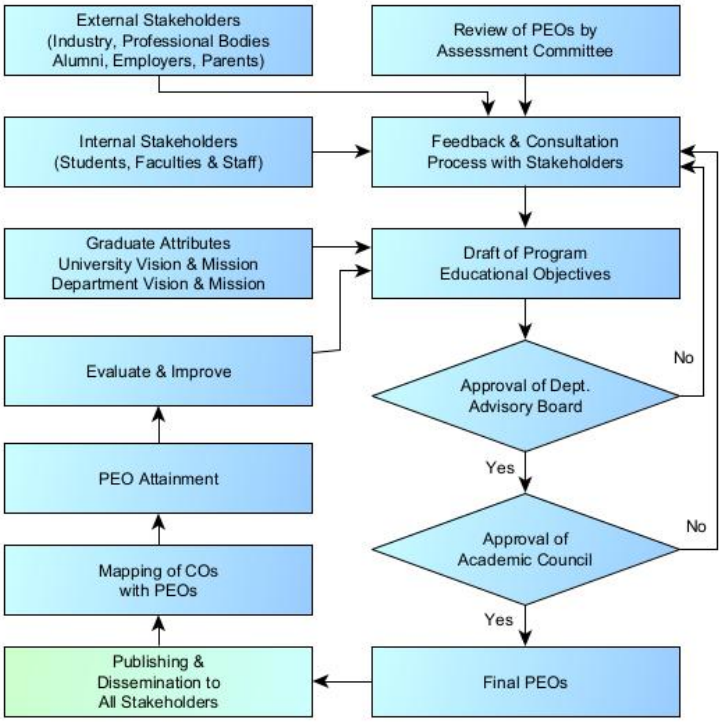

Figure 6: Block diagram for establishment of PEO

11.1 PEO Establishment Process (ST/Assingment/Quiz)

Step 1: The assessment committee reviews the PEO's related to professional and career achievements of alumni and attainments of program outcomes every three years.
Step 2: The draft PEO's are then defined by considering the feedback from both internal and external stakeholders.
Step 3: The draft PEO's are validated by checking its alignment with the CO's and the graduate attributes defined by NBA .Consistency of PEO's with department's mission and vision are also kept in view.
Step 4: The Assessment Committee summarizes the collected views and forwards the draft PEO's to Department Advisory Board for approval.
Step 5: The CO's are mapped with the approved PEO's and are published and disseminated.

12 Teaching learning and Monitoring process

The implementation of teaching learning and monitoring process is carried through a systematic procedure as shown in the flow chart and explains in detail

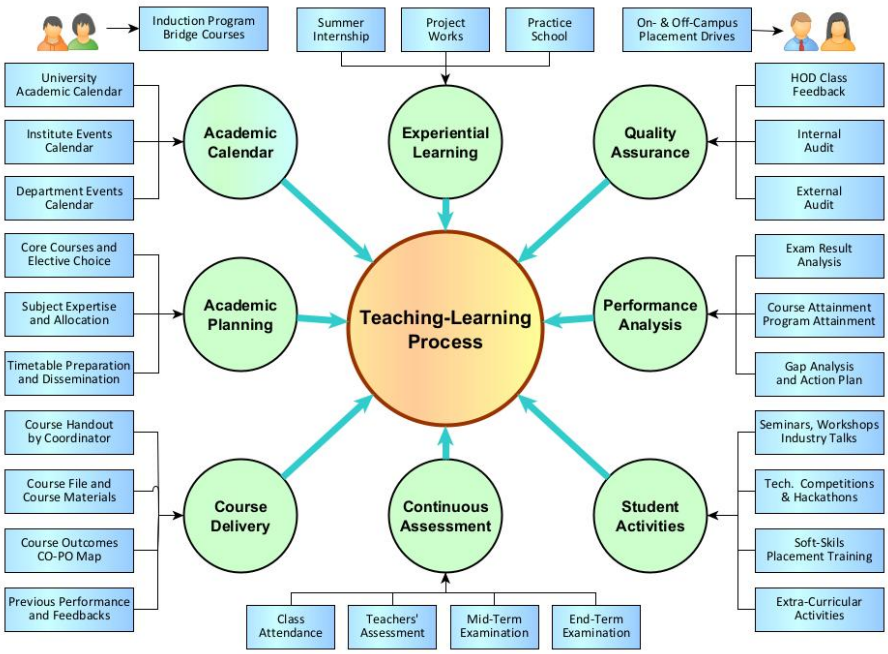

Figure 7: Block diagram of Teaching learning process

12.1 Program Assessment Committee (PAC)

The Program Assessment Committee (PAC) has been formed by each department for monitoring of all academic activities. The PAC consists of faculty members and technical staff of the department who periodically monitors the departmental activities and evaluates different parameters.

Composition: The composition of the PAC is as follows.

1. Head of the department (Chairman)
2. All the faculty members of the Department.
3. All the technical staff of the Department.
4. One member nominated by IQAC.
5. One faculty nominated by Basic Science and Humanities Department.

Roles and responsibilities: The roles and responsibilities of PAC are as follows.

- Monitoring the achievements of Program Outcomes (POs), Program Specific Outcomes (PSO), Program Educational Objectives (PEOs).
- Evaluating program effectiveness and proposing necessary changes.
- Preparing periodic reports on program activities, progress, status or other special reports for Management.
- Motivating the faculty and students towards attending workshops, developing projects, working models, paper publications and engaging in research activities.
- Interacting with students facilitating the achievement of POs, PSOs and PEOs.
- Interacting with stakeholders regarding the improvement of POs, PSOs and PEOs.

12.2 Pedagogy for Theory and Practical Course

Before Semester Starts: The Subject Coordinator, in collaboration with faculty members teaching the course, prepares the Course Handout based on the prescribed syllabus. Topics extending beyond the syllabus are also identified and planned where appropriate to enhance learning depth and relevance.

Learning Outcomes are clearly defined and aligned with the Course Outcomes (COs), following Bloom's Taxonomy levels to ensure appropriate cognitive progression. The finalized Course Handout is then published on the ERP system, enabling students to clearly understand course expectations and their role in achieving the stated Course Outcomes.

During the Semester: After each assessment, an analysis report is prepared to evaluate student performance and learning outcomes. Student attendance records are systematically maintained throughout the course delivery to ensure proper monitoring of participation.

In addition, special academic activities are organized in alignment with the course syllabus to enhance understanding and reinforce key concepts. A counselling report is also maintained for students whose performance falls below the expected benchmark of 75%, enabling targeted academic support and guidance for improvement.

End of Semester: At the end of the semester, the Program Coordinator evaluates the effectiveness of the teaching and learning process. This involves assessing whether the course content, delivery methods, and assessment strategies implemented throughout the semester are aligned with the initial teaching plan.

Additionally, a Course End Survey is conducted and its analysis is carried out to gather feedback on the overall learning experience, further supporting continuous improvement of the course delivery.

12.3 Preparation of Teaching Plan:

The preparation process for teaching and learning involves two key steps. The Program Assessment Committee (PAC) receives the Outcome-Based Education (OBE) curriculum of the department after obtaining due approval from the Department Board of Studies (BOS) and the Academic Council.

Subsequently, the university provides the detailed academic schedule and timetable and ensures the availability of necessary infrastructure to support the teaching–learning process. The details of these steps are outlined below:

1. **CURICULLUM DESIGN (The OBE curriculum of silicon):** The University prescribes the syllabus which specifies the number of lectures, list of recommended books, online resources, evaluation scheme of teacher's assessment and written assessment. The curriculum is designed by the department and approved by BOS and academic council as per the defined process in section(7).

2. **Academic calendar:**

   Silicon University follows a structured and well-planned teaching and learning strategy to ensure the quality of its academic programs. At the beginning of each academic year, the University publishes an academic calendar that outlines key academic dates and events. This calendar serves as a reference for students, faculty, and staff to stay informed about important milestones throughout the semester and academic year. It is also useful for prospective students, alumni, and parents.

   Based on the institutional calendar of events, each department develops its own department-specific calendar, tailored to the requirements of its respective academic program. One sample academic calendar is shown below:

Silicon University, Bhubaneswar, Odisha

Academic Calendar for Even Semesters of AY 2025-26 (Version 1.2)

*(Note: All dates are in dd/mm/yyyy format. The dates for the * marked events are expected dates)*

Program >>	B.Tech (UG Engineering)				MCA/M.Sc/M.Tech		Integrated MCA	
Semester >>	8th Sem.	6th Sem.	4th Sem.	2nd Sem.	4th Sem.	2nd Sem.	4th Sem.	2nd Sem.
Start of Semester (Classes Begin)	05/01/2026	05/01/2026	05/01/2026	05/01/2026	05/01/2026	05/01/2026	05/01/2026	05/01/2026
Registration (Without Fine)	05/01/2026	05/01/2026	05/01/2026	05/01/2026	05/01/2026	05/01/2026	05/01/2026	05/01/2026
	15/01/2026	15/01/2026	15/01/2026	15/01/2026	15/01/2026	15/01/2026	15/01/2026	15/01/2026
Submission of Class Feedbacks by HOD	31/01/2026	31/01/2026	31/01/2026	31/01/2026	31/01/2026	31/01/2026	31/01/2026	31/01/2026
Mid-Term Examination	28/02/2026	27/02/2026	28/02/2026	28/02/2026		28/02/2026	28/02/2026	28/02/2026
	06/03/2026	07/03/2026	07/03/2026	07/03/2026		07/03/2026	07/03/2026	07/03/2026
Result of Mid-Term Examination *	04/04/2026	04/04/2026	04/04/2026	04/04/2026		04/04/2026	04/04/2026	04/04/2026
Repeat Mid-Term Examination	28/03/2026	27/03/2026						
	04/04/2026	04/04/2026						
Result of Repeat Mid-Term Examination *	24/04/2026	24/04/2026						
Make-Up Tests (Univ. Batches)			27/03/2026	27/03/2026		27/03/2026	27/03/2026	27/03/2026
			04/04/2026	04/04/2026		04/04/2026	04/04/2026	04/04/2026
Result of Make-Up Tests *			24/04/2026	24/04/2026		24/04/2026	24/04/2026	24/04/2026
End of Semester (Classes End)	01/05/2026	01/05/2026	01/05/2026	01/05/2026	01/05/2026	01/05/2026	01/05/2026	01/05/2026
No. of Teaching Days / No. of Working Days	72 / 94	72 / 94	72 / 94	72 / 94	72 / 94	72 / 94	72 / 94	72 / 94
End-Term Examination	07/05/2026	07/05/2026	07/05/2026	07/05/2026	07/05/2026	07/05/2026	07/05/2026	07/05/2026
	13/05/2026	20/05/2026	20/05/2026	20/05/2026	20/05/2026	20/05/2026	20/05/2026	20/05/2026
Submission of TA and Lab Marks By	09/05/2026	09/05/2026	09/05/2026	09/05/2026	09/05/2026	09/05/2026	09/05/2026	09/05/2026
Result of End-Term Examination *	18/06/2026	18/06/2026	18/06/2026	18/06/2026	18/06/2026	18/06/2026	18/06/2026	18/06/2026
Summer Internship Program		25/05/2026	25/05/2026	25/05/2026		25/05/2026	25/05/2026	25/05/2026
		04/07/2026	04/07/2026	04/07/2026		04/07/2026	04/07/2026	04/07/2026
Supplementary Examination	27/06/2026	27/06/2026	27/06/2026	27/06/2026	27/06/2026	27/06/2026	27/06/2026	27/06/2026
	11/07/2026	11/07/2026	11/07/2026	11/07/2026	11/07/2026	11/07/2026	11/07/2026	11/07/2026
Result of Supplementary Examination *	05/08/2026	05/08/2026	05/08/2026	05/08/2026	05/08/2026	05/08/2026	05/08/2026	05/08/2026
Start of Next ODD Semester (AY 2026-27)	**10/08/2026**	**10/08/2026**	**10/08/2026**	**10/08/2026**	**10/08/2026**	**10/08/2026**	**10/08/2026**	**10/08/2026**

Released On: 26/12/2025

Dean (Instruction)
Silicon University

Figure 8: Sample academic calendar

3. **Subject allotment:**

   The Subject Allocation Committee, in consultation with the Head of the Department (HOD), assigns subjects to faculty members by considering their preferences and areas of expertise. To ensure the smooth delivery of the curriculum, subjects are allocated based on faculty competency and teaching experience.
   This process is completed approximately one month before the end of the previous semester, allowing faculty members adequate time to prepare for their assigned courses in the upcoming semester. Each subject is assigned a Subject Coordinator, who, along with other faculty members teaching the same course, develops the Course Handout. This document includes course objectives and course outcomes aligned with the department's academic calendar.

4. **Time table & planning:**

   To support timetable preparation and documentation, the university provides an Enterprise Resource Planning (ERP) system. Using this platform, the Subject Coordinator prepares a detailed unit-wise and date-wise lesson plan.
   The Course Handout is reviewed and duly approved by the Head of the Department (HOD) and subsequently made accessible to students through the ERP system. Based on the approved lesson plan, the work completed is systematically recorded in the academic file to ensure proper syllabus coverage, which is regularly monitored by the HOD.
   Schedule of quiz test, deadline for assignment, other internal examinations (if any) and semester examinations (Mid Semester & End Semester) are displayed at the beginning of each semester. Training, induction, guidance is imparted to newly joined faculty members for building and maintaining academic culture in the university.

5. **Learning ambience and resource development (infrastructure and facilities):**

   Silicon University provides high-quality infrastructure that meets international standards. The University has upgraded its classrooms to support modern teaching tools and techniques, including Wi-Fi-enabled LCD projectors.

It offers well-equipped laboratories, tutorial rooms, a library, state-of-the-art lecture theatres, and a fully equipped auditorium with a seating capacity of over 350 people. In addition, the University has implemented strong safety and security measures. The campus is equipped with CCTV surveillance to ensure vigilance and maintain a secure environment for its large academic community.

12.4 Curriculum Delivery

The effective implementation of the curriculum is supported by enriching classroom teaching through a variety of academic and experiential learning activities. These include expert lectures, presentations and seminars, mini projects, in-house and industry-sponsored projects, tutorials, group assignments, case studies, industry visits, industrial training, internships, hands-on sessions, e-learning platforms, NPTEL lectures, technical quizzes, assignments, and internal tests, as outlined below.
Training needs of faculty members are identified by the Head of the Department. Faculty are encouraged to participate in Short-Term Training Programs (STTPs), Faculty Development Programs (FDPs), seminars, workshops, and industry training to bridge skill gaps and enhance their teaching effectiveness.
In addition, content beyond the prescribed curriculum is identified and delivered through both classroom and laboratory sessions to expose students to emerging trends and advancements in the industry.
For each Learning Outcome, the following are planned for course delivery:

- Content of delivery
- Development and usage of ICT tool methods (Teaching Aids and Teaching Methods)
- The assessment frequency.

All the information are recorded in the ERP. Some of the teaching aids and teaching methods are shown below:

- Power point presentation
- Group discussion
- Seminar
- Charts
- Quiz
- Physical models
- Animations and videos

picture or table to be attached here
The teaching learning process at Silicon University consist of

1. **Traditional teaching learning methods:**
    - Course file
    - Lab manual
    - Assignment
    - Tutorial

2. **Collaborative teaching learning methods:**
    - Guest faculty
    - Beyond syllabus
    - Skill enhancement and project work
    - Tutorial
3. **Modern teaching learning methods:**
    - MOOCs course
    - Webinar
    - Flip classroom

12.5 Traditional teaching learning methods:

Traditional teaching learning method consist of

12.5.1 Course file:

For each course, a course file is developed and prepared by the concerned subject coordinator along with faculty members teaching the same subject. The course file consists of the following items:
Course Learning Objectives: Course objectives are clear and concise statements that describe what we intend our students to learn by the end of the course.
Pre-requisites: Most of the courses in higher semesters need some prerequisite knowledge of the subjects taught in lower semesters. So, we mention the course prerequisites for each such course for the benefit of students.
Course Policies and Procedures: This section of the course file highlights the rules for student assignments, Assignment Grading System, in-Class Quiz Sessions, laboratory tests and end-semester examinations are defined.
Evaluation policy is made in such a way that the level of questions are formulated based on understanding, application, analysis of concepts and design of applications from the concepts.
Lesson plan: Lecture schedules are prepared for the course detailing individual lectures by the faculty member before the commencement of the semester, and it is duly approved after careful examination by the Head of the Department, and made available to the students. The lesson plan encompasses the learning outcomes and the assessment of outcomes. This includes the list of additional topics to meet the outcomes, if required.
Course Outcome: The course files also contain five to six course outcomes which have been prepared by the course coordinator along with the concerned faculty members. It also mentions the program outcomes which are achieved by the course.
Lecture Notes: The course file also contains the lecture notes on the topics mentioned in the lesson plan. The lecture notes may be handwritten documents, or typed documents or slides to be used in the class.
Question banks: Questions are prepared from each topic by the concerned faculty members and maintained in the ERP. They are prepared as per the course objectives, evaluation policy and also considering the nature of the semester question papers. The surprise tests and previous semester question papers are also maintained in the course files.

12.5.2 Lab manual

A "lab manual" is a guide to the instructors. It helps the instructor to know about the topics and procedure needs to be followed for the smooth conduction of the lab. In Silicon for each lab

course, a lab manual is prepared by some of the experienced faculty members and approved by the HoD. It is followed by the concerned faculty member and the laboratory staff to conduct the lab. Each lab manual contains the objective of the lab, its outcome, the matching Program outcome and Program specific outcome. It contains the list of experiments with program outcome and program specific outcome attained. The topics beyond the syllabus are also mentioned in the contents. For each experiment the objective, resources used, overall logic of the program, detailed procedure to be followed, source code, sample input/output, pre-lab questions, lab assignments, post-lab questions are specified.

12.5.3 Assignment

The assignment is a qualitative performance assessment tool designed to assess students' knowledge of engineering practices, framework, and problem solving. Throughout the semester students are given some assignments based on the recent topics covered at the moment. A uniform assessment analytic is provided to assess student's knowledge with respect to the associated learning outcomes.

12.5.4 Tutorial

Silicon University Provides tutorial classes to shift the focus from passive content delivery to active. Tutorial classes play a crucial role in Outcome Based Education (OBE) by providing student-centered learning that ensures clear achievement of defined outcomes. In tutorial sessions, students engage more deeply with concepts through problem-solving, discussion, and guided practice, which helps them apply theoretical knowledge to practical situations. This interactive environment allows instructors to continuously assess student understanding, identify learning gaps, and provide timely feedback, thereby improving attainment of course outcomes. Tutorials also encourage critical thinking, collaboration, and self-directed learning—key competencies emphasized in OBE. Overall, they act as a bridge between lectures and real-world application, ensuring that learners not only understand the subject matter but can effectively demonstrate the skills and competencies expected at the end of the course.

12.6 Collaborative teaching learning methods

12.6.1 Guest faculty

Guest faculty play an important role in Outcome Based Education (OBE) by enriching the teaching–learning process with real-world experience, industry insights, and specialized expertise that complement the regular curriculum. Since OBE emphasizes measurable learning outcomes and practical application of knowledge, Silicon University organises guest lectures to help students understand how theoretical concepts are applied in professional settings, thereby improving attainment of program outcomes and graduate attributes. They expose learners to current trends, tools, case studies and expectations of the industry, which enhances employability and bridges the gap between academia and practice.

12.6.2 Beyond syllabus

Silicon University provides students with an enriching and successful educational experience by incorporating components beyond prescribed course material. This extends the curriculum by engaging, inspiring, and motivating students through diverse learning experiences. Silicon is committed to teaching beyond the syllabus, as it strengthens and broadens students' knowledge while enhancing their interest and engagement in the subject. To achieve this, the University adopts various academic and co-curricular approaches that support holistic learning and improved educational outcomes.When it comes to providing your students with an enriching,

successful educational experience, every teacher knows it's not simply enough to stick with the source material. In fact, what makes teachers great is their ability to go beyond the curriculum, inspiring and encouraging their students with other engaging activities. Silicon believes in teaching beyond the syllabus because it strengthens and expands students' existing knowledge and adds interest to the course. For this purpose, the University practices some of the following ways to achieve the goal.

- **Restorative circles:** For students facing difficulties or requiring emotional support in or outside of their university life, simply keeping up with a lesson can be too much. Silicon helps the students to develop emotional coping skills based on raising concerns and emotions, creating supportive spaces and educating other classmates about appropriate responses.

- **Inquiry-based Learning:** Inquiry-based learning shifts the focus from memorizing facts and figures to actively engaging students in the learning process through questioning, exploration, and discovery. By encouraging curiosity and deeper involvement with subject matter, it fosters a stronger desire to learn and understand concepts meaningfully. While it may appear challenging to implement in some educational settings, its application in project-based and experiential learning makes it highly effective. When students are given opportunities to investigate real problems rather than rely solely on fact-based instruction, they develop critical thinking, problem-solving, and independent learning skills that a traditional, rigid curriculum often cannot cultivate.

- **Team-building:** Team-building activities aim to provide students with the foundational skills required for more structured collaboration in their future academic and professional lives, whether in project-based learning or higher education. These essential skills—such as communication, cooperation, leadership, and problem-solving—extend beyond the classroom and are valuable in everyday life as well. By working in teams, students learn to share responsibilities, respect diverse perspectives, and work collectively toward common goals, thereby preparing them for real-world challenges and enhancing their overall personal and professional development.

- **Self-directed Learning:**Self-directed learning enhances engineering education by fostering critical thinking and more dynamic approaches to learning. Problem-solving and decision-making are essential to student development, and active, engaging methods in lesson planning can greatly benefit learners. These approaches encourage students to question ideas, expand knowledge, and deepen understanding. Learning beyond conventional boundaries often enriches the student experience. Self-directed learning helps students move beyond the limits of traditional instruction. For teaching to be engaging and meaningful, these concepts are essential.

12.6.3 Skill Enhancement and Project Works

Employability skills are personal qualities that make a student "employable." They are often referred to as soft or transferable skills because they are distinct from technical knowledge and work experience and can be applied across most jobs and industries. In today's competitive job market, these skills are essential for standing out. While a strong engineering degree is important, many graduates possess similar qualifications, so employers often base final hiring decisions on additional skills candidates bring. In Silicon, the Industry Interface Cell focuses on developing these competencies to ensure students are industry-ready.

- Communication and teamwork

- Creative thinking/Critical thinking

- Managerial skills/Leadership skills
- Problem Solving skills
- Initiative and Enterprising
- Planning and organizing
- Interpersonal skills
- Adaptability of flexibility
- Lifelong Learning

Beside the above Silicon practice the following for better skill enhancement:

- Silicon takes a lot of efforts in updating the curriculum for engineering programs with emphasis on enhancing employability. Some of the courses in the emerging areas like AI, IoT, Robotics, Block chain, Machine learning, Data Science and Cyber security are recommended by AICTE to be included in the model curriculum so that the future engineers will be industry ready.
- Most of these courses are interdisciplinary in nature and requires the knowledge of multiple domains. We introduced courses on creativity and innovation to stimulate problem-solving skills in future engineers.
- The student are also be introduced to the industry-initiated courses by entering into MoUs with relevant industries. This not only improves the industry academia interaction but also enhances the employability of the graduates.
- Compulsory summer/industry internships is helpful to the students to get to know the industry work culture and help them to prepare themselves in that direction.
- Not only the content part of the curriculum, but also the effective assessment methodology is equally important to make the overall curriculum effective and meet the objectives. In this direction, Silicon focuses on continuous assessment, verity in the methods so that students are up to date with their learning.
- Teachers emphasise on application-based learning and discourage rote learning. This help in developing critical thinking and promoting deep learning.
- We encourage students to participate in national and international technical competitions. In addition to the accolades they win, it also helps students to demonstrate the leadership skills, communication skills and ability to work as a team, which takes them to greater heights.

The final year project work, which has a provision for the students to undertake projects offered by the industries, can be a great employability booster. A Project Course work is culmination of all theoretical and laboratory courses that are typically interdisciplinary in nature, incorporating appropriate complexity of design alternatives and constraints, and can be completed with a realistic effort. Assessment of major project usually is reflection of attainment of all POs and PSOs of a program. Thus, Major Project has importance in any Engineering curriculum.

The selection and evaluation of the project work at silicon has the following eight steps.

1.Initiatives

- The student's projects are selected in line with Program outcomes.

- Students are provided with brief idea of various fields for selecting the project ideas.
- The list of previous year projects is displayed at notice board that ensures no repetition of project work and also encourages students to enhance on previous works.
- Faculty members encourage students to carry out in house projects and support is provided with all necessary software and hardware.
- Faculty members encourage students to participate in project exhibitions. The project exhibition was aimed to provide common platform to exhibit their innovations and their work towards excellence in latest technology.
- Faculty members encourage students to publish their project work in reputed journals / conferences.
- Faculty members encourage students to avail the external funding schemes for their project work.
- A project coordinator is appointed by the Head of the Department who is responsible for planning, scheduling and execution of all the activities related to the student project work.

2. Impact analysis

- New innovative ideas are born out of project work
- Skills or abilities of students were improved
- Knowledge on various aspects of project management were developed
- Confidence level of the students was boosted
- Improved teamwork spirit
- Implementation and deployment of the project for social benefits
- Document preparation and presentation
- To showcase the project work in project exhibitions

3.Identification of projects and allocation methodology to Faculty Members

- Projects are identified to relevant context. The need for the project and the end users of the project are verified for the current context.
- The problem definition with their requirements and constraints are verified. The knowledge, methodology, skill set and interest of the students to implement the project are considered to undertake the projects.
- In general, a project team consists of two to four students.
- Faculty profile should match with the domain of the student's project.
- Students are also given choice to choose their guide that matches their project domain.
- Types and relevance of the projects and their contribution towards attainment of POs.
- Current academic projects are mapped to POs and PSOs.
- Each project is evaluated and graded according to their project quality and with their contribution towards attainment of POs.

4.Process for monitoring and evaluation

- Project students meet their respective guide weekly once and asked to explain their progress they have done in their project in that week. This is recorded in Project diary of the students.
- They submit project progress report weekly once and to get approved by the respective guide.
- The project guide evaluates the report submitted by the students and helps them to go with project work.
- The Project guide assesses each student in the team and supervises them to work properly.

5.The committee constituted for making the regulations for evaluation and also complete evaluation process has the following members:

- Department Project Coordinator
- Two senior faculties from the department preferably from different specialization.
- One faculty from another department

6.Process to assess individual and team performance

- Progress of the project work is reviewed in regular intervals by the guide. The guide may invite other faculty members of the department for the review process.
- During the review, each member of a project group presents his/her contribution to the project.
- Performance of a project group is based on their presentation; viva voice and progress work they show to their guide.

7.Quality of completed projects/working prototypes

- Final project presentation and the report are evaluated by a team, constituted of three faculty members including the guide. Each team consist of at least one Professor/Associate Professor.
- For evaluation of eighth semester projects, an external examiner is invited as per the University norms.
- The projects are evaluated and are graded according to the project contribution towards attainment of POs and PSOs.

8.Best Project Evaluation scheme

- Innovations recognize the need for lifelong learning
- Contemporary issues, organization of the report
- Listening to and answering questions
- Publications and internal and external marks
- Project exhibition results

12.7 modern teaching learning methods

The institute recommends the followings to the students by which they can learn many things beyond the syllabus:

- **MOOC:** The power of internet: Massive Open Online Courses are the great equalizers that people wish for! Platforms like Udemy, Udacity, Coursera and edX to name a few, offer quality courses you can learn at your pace, and crucially gain certifications if needed by paying a token fee. It is not so much about the certifications but rather the knowledge gained which you would not get in your university curriculum or even if there is, you wouldn't learn at the rate or the kind of information that you would need.
- **Peer-to-peer Network:** This is just a fancy way of saying that you can always gain knowledge from the people around you! Friends offer new perspectives on topics and can help you with things you might not have understood immediately.
- **You-Tube Videos:** The whole platform is full of different varieties of video content which can be entertaining as well as educational in nature. It doesn't have to be necessarily related to what your field of study is- there is so much knowledge about things you can get to.
- **Research Papers:** With the rise of the internet, there are better ways to understand ideas and process content. Books alone cannot always provide that as some of the books are written in such a way that many fall to sleep reading through the words. The rate of flow of information and discoveries being made in the modern era, by the time you start reading the book, some of it's content would already be outdated. So, if you are going to read something that might be beyond your comprehension, go for the latest research papers that are published.
- **Social Networks:** There are so many ways of using your social media to help you in your quest for knowledge. Some of these include:
  - **Stack Over Flow:** It's not just there for coders, there are forums for everyone.
  - **Hacker News:** Their content is skewed towards tech and startup news, but good to keep updated with the latest through user-curated content.
  - **Twitter:** Follow the relevant people in your field who talk regularly about the topic you want to know more about.
  - **Face book groups:** Likeminded people talking about the topics they want (although quality is lower compared to the previous mentioned platforms).
  - **Quora:** Some good answers on certain topics are present, just that you have to dig deep to find them.

In each semester the faculty members teach some of the topics which are not mentioned in the syllabus. Sometime the students also get some assignments which are based on the topics not mentioned in the syllabus. This helps the students to explore some of the recent topics.

12.8 Instructional Strategies

Identifying appropriate instructional strategies to meet the needs of a heterogeneous class and a wide range of courses is a key challenge that faculty members at Silicon have addressed effectively. The Course Coordinator, in collaboration with faculty members, determines the teaching-learning approaches to be adopted. The following strategies have been implemented at Silicon.

1. **Students Participation:** Students participation in discussion, preparation of worksheets and models has been effectively utilized to keep the students interest in the subject.

2. **Non-Linguistic Representations:** For better communication of ideas and process non-linguistic representations through models, charts, animations and live demonstration in laboratories and classrooms are effectively used by faculty members.

3. **Cooperative Learning:** Students groups are formed to share their knowledge and collaborative studies for effective and timely learning.

4. **Known to un-known:** Sometimes academically challenged students are helped based on their present knowledge and enhancing it in pace appropriate to them.

5. **Simple to complex:** In the above strategy the interest of the students is kept alive through simple examples and making it complex slowly so that the students can understand it at the required depth.

6. **Application of the Knowledge:** Engineering students can learn and realize the concepts better once they apply it to simple models. This is done through suitably designed experiments in laboratories.

7. **Periodic Tests:** To keep the students updated with the knowledge acquired continuous evaluation is done both for theory and laboratory components of each subject. The test results are intimated to the students and the performances are analyzed to counsel them appropriately.

8. **For Large Class:** Usually the class size around sixty in Silicon. However for some special classes when the size more adequate majors like audio arrangements are done. Also, after such large classes' tutorials are conducted to clarify the doubts of the students which are difficult in a large class.

9. **Special classes:** Special classes are arranged for students with learning difficulties. These special classes are arranged during evening hours by concerned faculty members as well as senior students. The senior students are paid appropriate remuneration for such activities.

10. **Communication:** Faculty members are trained periodically for improving their communication skills. They are trained how to use the modern technologies for better communication ideas. Students having difficulty in understanding the language are also trained in our language laboratory so that their listening skill improves.

11. **Mentoring:** For every 20 students a faculty is attached to address their difficulties and needs. Such rapport with students helps the Institute to maintain discipline, to counsel the students based on their need and to obtain better performance from the students.

12. **Evaluation of Teaching:** The teaching quality of a faculty member is evaluated by taking several things into consideration. Student's feedback on teacher is taken online during the semester, performance of students in a particular subject and inspection of the course file of the faculty member for specific subject. Senior professors visit the classes of faculty members randomly to observe their teaching effectiveness. Faculty members are appraised about this evaluation outcome and necessary counselling is done to them wherever required.

12.9 Continuous Assessment

In Silicon the students are assessed continuously during the semester. Beside the mid-semester and end-semester examinations, the students are also assessed through surprise test, quizzes and assignments continuously. In each semester at least two surprise tests are conducted to know about the regular performance of the students during the semester. The surprise tests are

conducted for half an hour duration. In the surprise test, the students are asked to solve some analytical questions to test their understanding. The questions in the surprise tests are asked from the topics covered in the last three classes. During the semester at least one quiz test is conducted on-line through ERP covering the syllabus covered at the point of test. Students are informed one week before the quiz test.

The assignment is a qualitative performance assessment tool designed to assess students' knowledge of engineering practices, framework, and problem solving. Throughout the semester students are given some assignments based on the recent topics covered at the moment. A uniform assessment analytic is provided to assess student's knowledge with respect to the associated learning outcomes.

- Question banks are prepared for each topic in the course based on the course objectives and considering the nature of the University question papers.
- Assignment problems are chosen from such question banks.
- Model solutions for assignment problems are prepared by concerned faculty.
- Continuous assessment system is implemented for assessment of assignments.

12.10 Methodologies to support slow learners and encourage advanced learners:

The students are tracked during their academic journey in the institute and special efforts are made to bring slow learners to come at par with the average/above average group. Students with good background and skills are guided to higher levels of achievements and encouraged towards challenging goals.
The Faculty Advisors regularly conduct meetings regarding progress of their mentees and are responsible to identify both weak and bright students. Students who score less than 60 % marks in three or more subjects in semester examinations are considered as academically slow learners and same is also intimated to their parents. Usually, top 15% of class are considered advanced learners. Students' attendance is also being monitored through ERP on every week and list of defaulter students are displayed on department notice board. Attendance of students is regularly being informed to the parents through SMS facility. Institute had made special provision of exhaustive soft skill training and exclusive counseling, to mould the slow and advanced learners to plan their careers and placements. Through this process slow learner are identified and following activities are carried out for them.

Encouragement to active learners:
In order to promote advanced teaching and learning methodologies to give motivation to learn, higher retention of knowledge through better understanding, increasing depth of knowledge and developing positive attitude to the subject taught following activities are planned.

1. Active learning: We adopt active learning by involving students in the learning process more directly through following activities:
   (a) Activities on technical content of syllabus like brain storming, quiz, debate, group discussions, role play, games, model making, mini project, presentations, case studies
   (b) Use of animation software
   (c) Active learning experiences through hands on training.
   (d) Challenging students to take up open ended problems requiring critical/creative thinking through active participation in state and national and international level competitions such as AVISHKAR, HACKTHON, etc.

(e) Use of team based learning and participative learning to do some short-term projects.

(f) Brief demonstration, case studies etc.

2. Collaborative Learning: We implement collaborative learning by forming student teams working together to solve a problem, complete a task, or design a product. Team works are done in activities like group projects, joint problem solving, etc.

3. Inquiry-based Learning: We make our classrooms as open systems where students are encouraged to search and make use of resources beyond the classroom for investigation of open questions/problems, developing their critical thinking and increasing understanding levels by performing review of research papers, Surveys etc.

4. Cooperative Learning: Focusing on cooperative learning methodologies by distributing the tasks to small group. Students work together to maximize their own and each other's learning in IE student chapter study circle and while performing various activities using think-pair-share, round table and one minute paper technique.

5. Problem based Learning: We assign students different tasks, assignments, portfolios, activities in which students engage in complex, challenging problems and collaboratively work toward their resolution by using inter-disciplinary knowledge to solve problems.

6. Experiential learning: We are adding field-based experiences, Internship, practicum, cooperative education, service learning and class based experiential learning by conducting activities like case studies, simulation, virtual lab, presentations and various types of group work.

7. Project based learning: The mandatory BE project is converted to a learning platform by using various tools of project management, solving real time challenges and giving the satisfaction of achieving the goal at the end of completing the project.

Activities for Slow learners:

1. Tutorials, discussions, interactions makeup, and remedial classes.

2. Personal, academic and social counselling.

3. Concept clarification and problem-solving exercises.

4. Provision of simple but standard lecture notes/course material.

5. Assignments and solving previous semester question papers.

6. Re-test for improvement

7. Revision of topics and practical (not as punishment but as an amelioration method).

8. Making them part of student teams wherein there is a admixture/blend of fast, medium and slow learners. Here, as a "team dynamics –cooperative efforts", the slow learner experiences adoptability, develops self-esteem, self-respect and confidence.

9. Steps to enhance their communication skills, art of reading – learning.

10. Guidance for Seminar/Project presentation

11. Extra practical sessions

12. Mock oral/practical examination

13. Monitoring their progress at every internal and semester-end examinations

Activities for advanced learners:

1. Provision of additional learning – reference material – Books, Review Articles and Reports, CDs and Internet surfing.
2. Student Seminars on selected reference topics.
3. Participation in Problem Solving –Decision Making Exercises.
4. Student Project Work based on theoretical data/practical work/survey data/ case studies.
5. Projecting them as "Team Leaders and Facilitators of Teams", comprising fast, medium and slow learners.
6. Best Student award of the year.
7. Topper of a branch in every batch is given merit scholarship for the economically challenged and meritorious students.
8. Scholars Club members provided with extra books from library
9. Encouragement to complete NPTEL certification courses
10. Induction in Clubs like Robotics, Drone etc.
11. Implementation of research papers
12. Participation in Seminars and Conferences
13. Motivational guest talks
14. Paper publication and presentation
15. Arranging workshop and seminar on current trends
16. Motivation and Guidance for higher studies (GRE, GATE, competitive exams)
17. Industry visits and Industry sponsored/research project
18. Patent filing process
19. In house Mini-projects (over and above the syllabus)
20. Arranging Project competitions

12.11 Innovation in Teaching-Learning Process

Innovative teaching and learning practices are introduced to stimulate student curiosity across diverse domains, encourage questioning of established ideas, and enhance classroom interaction.

Rapid technological advancement presents a major challenge to the teaching-learning process, as facilitators often struggle to keep pace with techno-savvy learners and continuously evolving tools and platforms. Maintaining student engagement throughout lectures is another concern. Since knowledge is readily accessible at the click of a button, faculty members face the additional challenge of staying updated with current trends and integrating them effectively into their teaching. To address this, the institute places strong emphasis on the teaching-learning process and provides continuous training to faculty members to enhance their pedagogical skills.

The impact of these efforts is evident both qualitatively and quantitatively. Qualitatively, students demonstrate improved etiquette, a stronger desire to learn, and a broader perspective on life. Quantitatively, there is an improvement in academic performance and increased participation in co-curricular activities. Graduates are performing well in the corporate sector, and some have successfully applied their learning to launch their own startups.

The following are the best and innovative practices adopted by faculty members to enhance the teaching and learning experience.

12.12 Academic Monitoring Process

HOD and Course Coordinator monitors the progress of syllabus coverage every fortnight through ERP. The number of lectures planned and the number of lectures actually conducted facilitates identification of gaps, if any, and necessary corrective actions are taken for filling the gap.

Following activities related to academic monitoring are carried out through ERP:

1. Preparation of Timetable: Class wise, Laboratory-wise, Classroom-wise, Individual,
2. Preparation of Teaching Plan
3. Attendance Monitoring: (Subject-wise, Class-wise, Percentage-wise)
4. Syllabus coverage Monitoring
5. Continuous Assessment
6. Internal Examination schedule, result analysis
7. Upload of assignments, video lectures, class notes
8. Students feedback
9. Communication to parents through SMS

13 Examination and Evaluation Process

Silicon University considers the Examination and Evaluation Policy an integral component of the teaching-learning process throughout a course. A variety of assessment methods are adopted for students enrolled in both UG and PG programs. The system is designed to promote continuous evaluation rather than relying solely on end-term examinations. This approach encourages students to study regularly, develop consistent learning habits, and avoid last-minute preparation. It also emphasizes sustained performance and discourages sporadic study patterns. In addition, the use of assignments fosters self-learning and enhances students' ability to apply concepts to practical problem-solving.

All examinations are conducted in accordance with the academic calendar. The examination schedule for each semester is released two to three weeks in advance and is displayed on notice boards as well as communicated through the ERP system. The Mid-Term Examination carries 20 marks per subject, has a duration of 90 minutes, and primarily covers Module I and Module II, with occasional inclusion of partially covered content from Module III. The End-Term Examination is conducted over 180 minutes, carries 50 marks per subject, and assesses the entire syllabus.

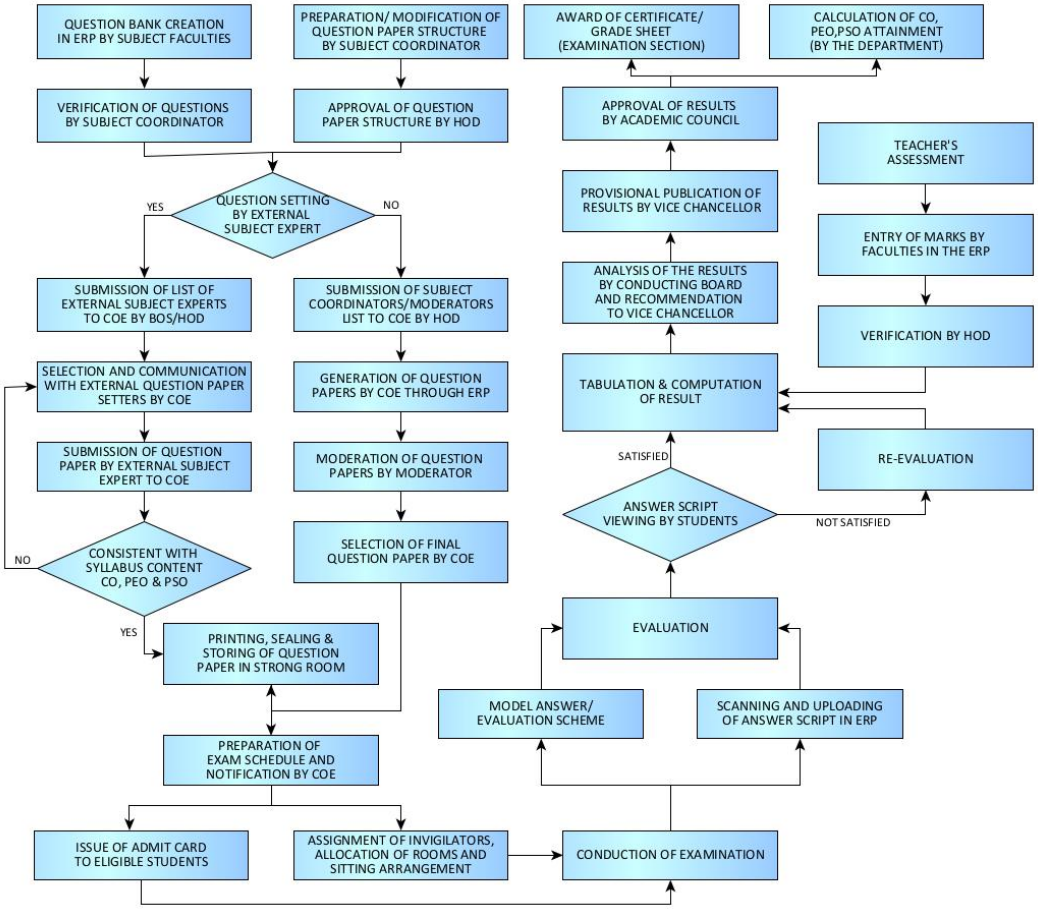

Figure 9: Block diagram of examination & evaluation process

13.1 Examination Section

Examinations are a key process for assessing and improving student performance. With the objective of enhancing the results of mid-semester and end-semester examinations, Silicon has an independent Examination Section. This section oversees all weekly, half-yearly, and pre-semester examinations conducted throughout the academic year. Results are published through the ERP system and regularly communicated to parents. To motivate academic excellence, ranker students are recognized and awarded. Parents are also able to monitor their ward's academic progress through ERP.

An Examination Committee is constituted to oversee routine examination activities. It includes the Controller of Examinations (CoE), Assistant CoE, and nominated faculty members from each department, and is headed by the CoE. The committee meets fortnightly to review schedules, conduct examinations, and address related matters. Four office assistants support the functioning of the Examination Section.

Additionally, an Examination Conducting Board is formed to review and validate results prior to publication. It is chaired by the Dean (Academics) and includes the CoE as convener, Assistant CoE, all Academic Heads of Departments, and the FIC ERP Academics as members. The board meets twice per semester after evaluation to review results and recommend approval to the Vice Chancellor.

Silicon is equipped with seven dedicated examination halls, each with a seating capacity of 100 and CCTV surveillance. The institution also maintains scanning rooms, strong rooms, and utilizes computer laboratories for online evaluation processes.

13.2 Question Paper Setting & Moderation

Question papers for Mid-Term and End-Term examinations (UG and PG programs) are prepared primarily through an electronic process defined in the ERP system. Faculty members with expertise or preference for teaching a subject contribute to the subject-specific question bank in the ERP. These questions are regularly verified by the subject coordinator nominated by the Head of the Department (HoD).

Before semester examinations, the subject coordinator prepares a model question structure and submits it to the HoD for approval. The HoD ensures that the structure appropriately reflects Bloom's taxonomy, with a balanced distribution of questions across cognitive levels. If necessary, the structure is returned for revision; otherwise, it is approved. Based on the approved structure, multiple question papers are generated through the ERP question bank.

The Board of Studies may also nominate external paper setters, subject to approval by the Controller of Examinations (CoE). External setters are experienced academicians with at least five years of teaching or research experience in the relevant subject. All question papers are moderated by a moderator appointed by the Board of Studies, who may be a subject teacher or an expert faculty member.

Final question papers are submitted to the CoE through a confidential ERP channel, while external paper setters may submit via password-protected email within the prescribed deadline. On the day of the examination, the CoE selects one paper from the moderated set.

All question papers are treated as confidential documents until the completion of the respective examination. Afterward, they become open resources and are archived in both physical and electronic formats for future reference. Questions are set with strict confidentiality, aligned with the prescribed syllabus and recommended textbooks, and maintained at the required academic standard.

Question Pattern: Questions are not merely reproduced from standard textbooks or from previous examination papers of this or any other university. They are designed to assess understanding at different cognitive levels and are typically framed in three types and across three learning levels, including their combinations.

The three types are: (i) Short Answer, (ii) Medium Answer, and (iii) Long Answer, which are decided by the question setter looking at the time required to answer the questions. The three learning levels are: (i) Remembering & Understanding, (ii) Application & Analysis, and (iii) Evaluating & Creating, which are decided by the question setter looking at the complexity and efforts required to answer the questions.

The syllabus in each subject is usually arranged in 5 - 6 modules corresponding to each CO of the course. Questions have different sections. In any section there will be one question from each module/CO. All questions are compulsory with some questions having choices within itself (from same module). Questions have different weight depending on the content. There may be several bits within one question and different bits may have different marks.

13.3 Quality of Question Papers

Quality of semester Question papers: At Silicon, mid- and end-semester assessments are considered critical for achieving Course Outcomes (COs) and Program Outcomes (POs). The evaluation policy for formative assessments, including semester examinations, is designed by the Course Coordinator in consultation with faculty members, with a focus on CO and PO attainment. This is further reviewed by the Program Coordinator to ensure consistency across courses and is finally approved by the Departmental Advisory Committee. As a result, each course follows a clearly defined assessment framework, which is communicated to faculty and students at the beginning of the academic session.

The process of question paper design and quality assurance follows a systematic approach:

- Semester examination questions are prepared by faculty members to evaluate attainment of COs and POs.
- The Subject Coordinator guides faculty on syllabus coverage while framing questions.
- Reference is made to question patterns from reputed universities and competitive examinations to maintain academic standards.
- Bloom's Taxonomy is followed to ensure balanced coverage of cognitive levels in question papers.
- Question papers are moderated to maintain consistency, quality, and fairness.

Questions are designed across varying levels of difficulty, including analysis, application of modern tools, and problem formulation, in alignment with Bloom's Taxonomy.

The questions are of three categories:

- One third of the questions is straight and can be answered by all students.
- One third of the questions need analysis and use of content covered as per syllabus.
- Remaining one third of the questions is not straight. Certain amount of thinking, analysis and mathematical knowledge are required to resolve.

Quality of Assignments: The assignment is a qualitative performance assessment tool designed to assess students' knowledge of engineering practices, framework, and problem solving. A uniform assessment analytic is provided to assess students' knowledge with respect to the associated learning outcomes.

Question banks are prepared for each topic in the course based on the course objectives and considering the nature of semester question papers. Assignment problems are chosen from such question banks. Model solutions for assignment problems are prepared by concerned faculty. Continuous assessment system is implemented for assessment of assignments.

13.4 Evaluation & Publication of Results

Evaluation Process: After the completion of Mid-Term or End-Term examinations for a subject, the answer scripts are scanned, processed, and uploaded for access by the appointed examiners. Examiners are nominated by the Controller of Examinations (CoE) based on recommendations from the Board of Studies. Typically, a panel of examiners prepares a model answer key collaboratively and submits it to the CoE prior to the commencement of evaluation.
The evaluation is conducted electronically within the university under appropriate security and access controls. In certain cases, examiners are also provided with the facility to evaluate answer

scripts remotely from home, subject to required permissions and safeguards.
The steps for the evaluation process of answer scripts at Silicon University are as follows:

- **Scanning, coding and Evaluation:** The scanning and coding of answer scripts are carried out with complete accuracy and strict confidentiality. Secrecy is maintained by providing subject-specific passwords to examiners. The e-evaluation system also enables the recording of all examiner remarks directly on the answer scripts, which are useful during re-evaluation. In addition, electronic checks and balances are in place to prevent errors, including missing pages or unanswered sections during the evaluation process.
  Answer scripts for each subject are made available for evaluation within two days of the completion of the respective examination. The evaluation is typically completed within one to two weeks from the time the scripts are released. The Controller of Examinations (CoE) may grant additional time to examiners based on the volume of answer scripts assigned.

- **Publication of Results** Results are declared within three to four weeks from the date of the last examination. After completion of evaluation for End-Term examinations, the Examination Conducting Board conducts a preliminary analysis of the results by reviewing marks across all components and submits a summary report with recommendations to the Vice Chancellor. With the Vice Chancellor's approval, the Controller of Examinations (CoE) office publishes the results. Students can access their results through the ERP portal.
  Following provisional publication, the Vice Chancellor presents the results to the Academic Committee for formal approval. Once approved, the Examination Committee facilitates the issuance of degree certificates and/or grade sheets to students. The results are also utilized by departments to assess attainment levels of Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes (PSO), and Program Educational Objectives (PEO).

- **Post Processing of Results :** If a student is dissatisfied with the marks obtained in the Mid-Term or End-Term examinations, they may apply to the Controller of Examinations (CoE) for re-evaluation in the prescribed format within two weeks of the release of answer scripts for student review. The CoE then initiates the re-evaluation process with selected faculty members and may revise the marks or results accordingly. If no application is submitted within the stipulated time, the result is considered accepted, and no further changes are permitted.
  After the re-evaluation deadline, grade sheets for students who have successfully cleared all subjects are prepared and distributed. For final-year students, provisional certificates are issued accordingly. Any corrections required in grade sheets or certificates can be requested through the CoE using the prescribed application format, after which the examination cell carries out the necessary corrections and issues updated documents.
  In cases of loss of grade sheets or certificates, students must apply for duplicate documents using the prescribed format, along with the required administrative fee and a copy of the FIR. The examination cell then issues duplicate grade sheets or certificates. Students requiring transcripts may also apply through the prescribed format with the applicable fee, and the examination cell provides the requested transcripts accordingly.

- **Procedure for Re-evaluation:** Re-evaluation of answer scripts is applicable for Mid-Term & End-Term examinations and of theory papers only. Applying for re-evaluation of answer scripts is available for Repeat Midterm or Supplementary Examinations. Notification for re-evaluation is notified by the Examination Cell on the day of uploading of answer scripts for student viewing. For re-evaluation, prescribed application with fee by the candidate through ERP is mandatory. No application for re-evaluation after the last

date is entertained. Separate faculty may be identified by the CoE for Revaluation. In the re-evaluation, if the variation in the marks is within 5 (five) marks in Mid-Term and 12 (twelve) marks in End-Term, then the better of the two is taken. If the variation is more than 5 (five) marks in Mid-Term and 12 (twelve) marks in End-Term, then it is sent for re-evaluation to a third examiner. In this case, the marks awarded by the third exam

14 Assessment Methods

14.1 Rubric for Assessment

A rubric for assessment clearly defines achievement criteria across different components of student work, including written, oral, and visual outputs. It may be applied to various forms of assessment such as assignments, class participation, and overall grading. The Outcome-Based Education (OBE) system at Silicon Institute uses two types of rubrics: holistic and analytical.
Holistic rubrics combine multiple assessment criteria and evaluate them together under defined performance levels. At Silicon, holistic rubrics are used for evaluating academic components such as skill labs and projects, where overall performance is assessed on parameters like leadership, innovative thinking, and ability to work in teams.
Analytical rubrics break down assessment into distinct criteria and evaluate each component separately. At Silicon, components such as mid-term examinations, end-term examinations, and teacher assessments are evaluated using analytical rubrics to ensure detailed and structured assessment.

14.2 Computation of Attainment

14.2.1 CO Attainment

The assessment of course outcomes involves the systematic collection and analysis of data to evaluate the effectiveness of teaching and learning resources. This process helps determine how well these resources have been utilized and leads to the implementation of remedial measures to enhance student learning and achieve the desired outcomes. The insights gained from this assessment can be used for:

- Enhancing teaching and learning methodologies
- Refining the syllabus for better alignment
- Introducing additional training programs, if required
- Redefining course outcomes to align with educational objectives

CO Attainment process can be defined as per the following steps:

1. **Creation of CO-PO-PSO mapping table** While designing the detailed curriculum of different courses, each course is designed with 4 to 6 well-defined Course Outcomes (COs) that specify what students will learn by the end of the course. COs are aligned with Bloom's Taxonomy (e.g., Remembering, Understanding, Applying, Analyzing, Evaluating, Creating).
   Level of Correlation/Mapping Factor: It indicates to what extent a certain component is mapped with the other. The correlation between CO - PO describes the level at which a particular PO is addressed through a CO.
   3 - indicates Substantial/High mapping (high correlation towards attainment)
   2 - indicates Moderate mapping (moderate correlation towards attainment)
   1 - indicates Low mapping (low correlation towards attainment)

2. **Setting up of CO attainment Levels:** Attainments are quantized into certain levels, 3 being the most common number of levels. CO Attainment are finalized by the course coordinator before commencing course delivery in a semester.
   For Example, we can set a Level as below:
   Level 1: a% Students scoring $\geq$ q% of max marks allocated to CO
   Level 1: a% Students scoring $\geq$ q% of max marks allocated to CO
   Level 2: b% Students scoring $\geq$ q% of max marks allocated to CO
   Level 3: c% Students scoring $\geq$ q% of max marks allocated to CO
   q% $\rightarrow$ The expected Proficiency % to attain a CO. For ex. It can be 55%
   a% $\rightarrow$ The High expected Attainment %. For ex., it can be set as 60%
   b% $\rightarrow$ The moderate expected attainment %. For ex., it can be set as 70%
   c% $\rightarrow$ The low expected attainment %. For ex., it can be set as 80%

3. **Setting up of Target Levels (by program HoD):** CO Attainment Targets
   i) Targets are quantized into certain levels, 3 being the most common number of levels. CO targets are finalized by the Department HoD before commencing course delivery in a semester.
   ii) Weightage for direct and Indirect attainments are finalized by the course coordinator. For Example, It can be 90% for direct and 10 % for indirect.

4. **CO Attainment Calculation** Attainment of COs can be measured directly and indirectly: Direct attainment of COs can be determined from the performance of students in all relevant assessment methods.
   Direct CO attainment

   - Direct attainment of COs is determined from the performances of students in Continuous Internal Assessment (CIA) and Semester End Term Examination (ETE).
   - The proportional weightages of CIA: ETE will be as per the academic regulations in force.
   - Direct attainment of a specific COs is determined from the performances of students in all the assessment items related to that particular CO.
   - Hence, every assessment item needs to be tagged with the relevant CO.
   - Also, we need data about performance of students assessment item – wise.
   - Continuous Internal Assessment (CIA) is conducted and evaluated by the relevant department itself. Thus, institution have access to question-wise marks in all assessment instruments in Continuous Internal Assessment (CIA).
   - When questions are tagged with relevant COs, the department has access to performances of students with respect to each CO.
   - For the Semester End Term Examinations, the direct attainment is calculated from the final mark for all CO's as average.

   Indirect CO attainment

   - Indirect attainment of COs can be determined from the course exit survey.
   - The exit survey form should be designed to get feedback from students on all the COs in 5 points scale then converted to 3-point scale.

5. **Gap Analysis**

   - If targets are achieved for that year, higher targets can be set (increase the target by 2% to 5%) for the following academic year as a part of continuous improvement.

- If targets are not achieved, an action plan should be performed to attain the target in the subsequent years.

The above process for CO attainment is also shown in Fig.

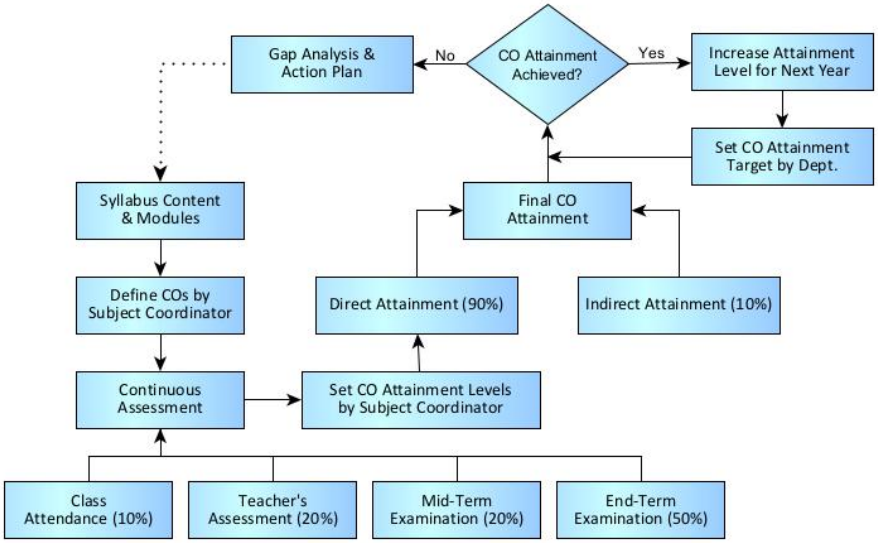

Figure 10: Block diagram of CO attainment calculation

14.2.2 PO & PSO Attainment

Attainment of Program Outcomes (POs) and Program Specific Outcomes (PSOs): The Program Outcomes (POs) and Program Specific Outcomes (PSOs) assessment is essential for ensuring that an academic program meets its educational objectives and continuously improves to align with industry needs, accreditation requirements, and student career readiness. The following points shows why assessment is required:

- It ensures that the program aligns with OBE (Outcome-Based Education) principles.
- Helps in identifying gaps between expected and actual student performance.
- Provides data for curriculum revision and instructional improvements.
- POs reflect generic skills such as problem-solving, communication, ethics, and teamwork, which are essential for professional growth.
- PSOs are specific to the discipline (like Electrical & amp; Electronics Engineering) and measure the students' technical expertise.
- Ensures that students develop competencies required by industries and research organizations.

PO/PSO Attainment Process: The attainment of PO-PSO is done through two components: Direct Attainment, and Indirect Attainment. Direct attainment is from student performance in various exams conducted throughout the year, whereas indirect attainment is from surveys like, Graduate Survey, Alumni Survey, Employer Survey. The process flow diagram is as shown below:

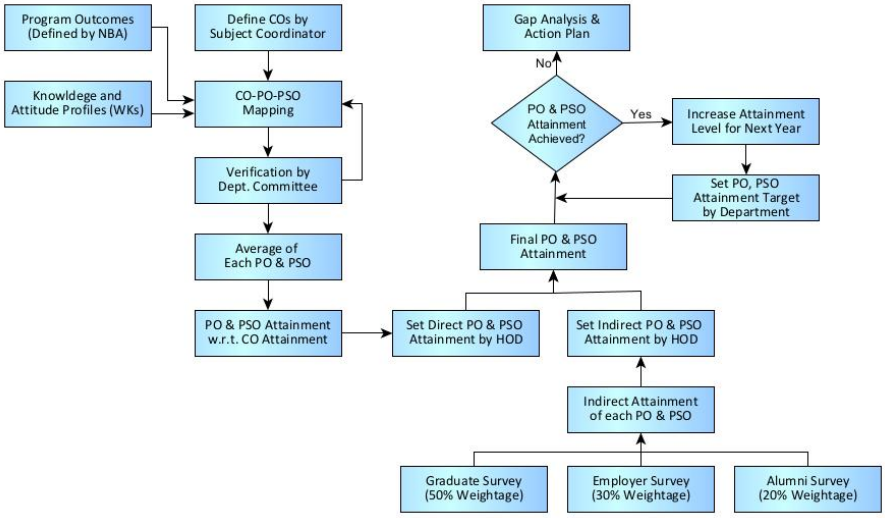

Figure 11: Block diagram of PO-PSO ATTAINMENT

Attainment Process & Assessment Tools:

1. **PO-PSO Attainment Targets & Weightage Set up**

   - Targets are quantized into certain levels, 3 being the most common number of levels. PO-PSO attainment targets are finalized by the department HoD, in the PO-wise manner before commencing course delivery in a semester.
   - Weightage for direct and Indirect attainments are finalized by the department HoD. For Ex., It can be 80% for direct and 20% for indirect.

2. **Direct PO attainment:**

   - Direct attainment of PO-PSO is determined from all courses CO-PO-PSO articulation matrix & corresponding CO attainment level.
   - For each course, each PO and PSO average is calculated.
   - For each program, all courses average PO's and PSO's and attainment are calculated.
   - Computation of PO and PSO by the formula:- (PO1 average value for subject 1 in predictor matrix * CO attainment value for subject 1) /3, which is computed.
   - Similarly, for PSOs the values are calculated and tabulated.
   - Average of all courses, computed PO's & PSO's are taken as direct attainment, which is done in step-3 matrix, last row.

3. **Indirect PO & PSO attainment:** Collection of feedbacks from Alumni Survey, Graduate Survey, Employer Survey in 5-point scale. Each survey consists of questions on 12 PO's and 3 PSO's . All the survey questions are framed such that it will link to each POs and PSOs.

   - Graduate survey feedback:This survey was conducted at the exit of the program (in their last year). The frequency of collection is every year.
   - Alumni survey feedback: This survey is conducted for the passed-out students, usually 2-3 year of their pass-out year. This is will be collected either through Google form circulations or in the annual alumni meet. The frequency of collection is every year.

- Employer survey feedback: This survey conducted by our II Cell coordinators by sending the question or feedback form to the employers, where our students are working more than 1 year. This will be basically done by email communications. The frequency of collection is throughout the year as per the convenience of the employers.

4. **Indirect PO and PSO's computation:** Followings are the steps for the analysis of all the survey data and the final value is tabulated.
   Weightage of 50%, 30%, and 20% are finalized by the departments for indirect attainment calculation for Graduate survey, Employer survey, and alumni survey, respectively.
   In next step, for each PO and PSO, indirect attainment computed by using above weightage. Then average of each PO and PSO is taken for indirect attainment. Each PO and PSO is converted to 3-point scale. Ex., 4.27*3/5=2.56

5. **Final computation of PO and PSO:** The final PO and PSO attainment calculation and target levels are finalized by the following formula.
   Final PO/PSO = (Direct PO/PSO Value*80%) + (Indirect PO/PSO Value*20%)

15 Curiculum Gap Analysis

The process used to identify the curricular gaps to the attainment of COs/POs is given in figure and is explained as below:

- **Step-1:** The course handling faculty, after CO-PO mapping, would submit CO attainment to Course coordinator.
- **Step-2:** The course coordinator would submit the CO-PO attainment along with curriculum gap identified in the course and recommendations to conduct co-curricular activities & identify content beyond the syllabus to Year wise coordinator.
- **Step-3:** The year wise coordinators who are the members of the PAC would consolidate the CO attainment of the respective year along with curricular gaps and recommendations to conduct co-curricular activities reported by course coordinators.
- **Step-4:** The PAC would consolidate the CO and PO attainment of the program with all the identified gaps and submit report to DAB.

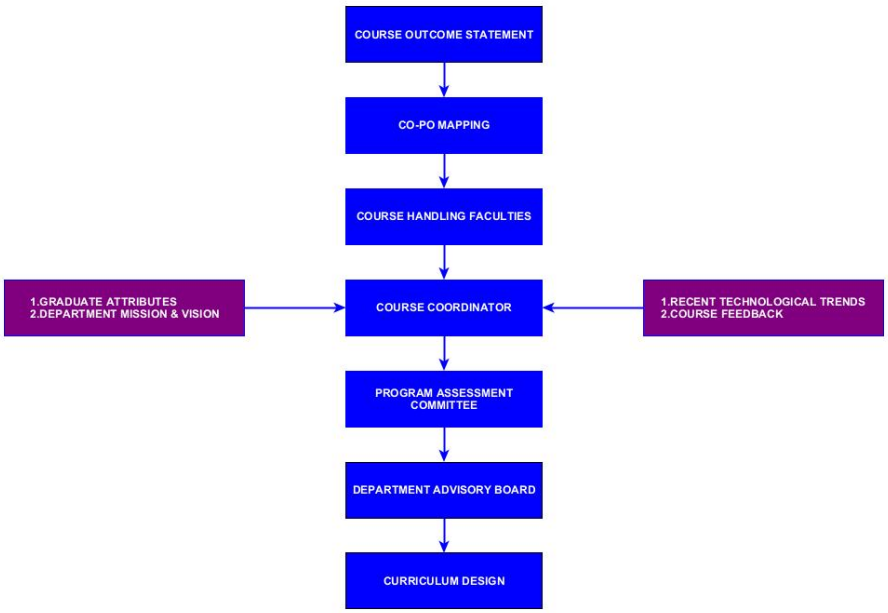

Figure 12: Block diagram of curriculum gap analysis

Program Assessment Committee after getting prior approval from DAB about the steps to be taken to bridge the curricular Gap and content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, industrial visit, in plant training, online quiz, etc.

16 Faculty Performance Appraisal System

The Faculty Performance Evaluation and Development System is designed to ensure continuous improvement in teaching quality, professional growth, and institutional effectiveness. It incorporates multiple feedback mechanisms and structured analysis to provide a fair and comprehensive assessment of faculty performance.

Objectives:

- To evaluate faculty performance through a multi-dimensional approach
- To encourage self-reflection and accountability among faculty members
- To incorporate student and administrative feedback in decision-making
- To recognize and reward high-performing faculty
- To provide support and development opportunities for underperforming faculty

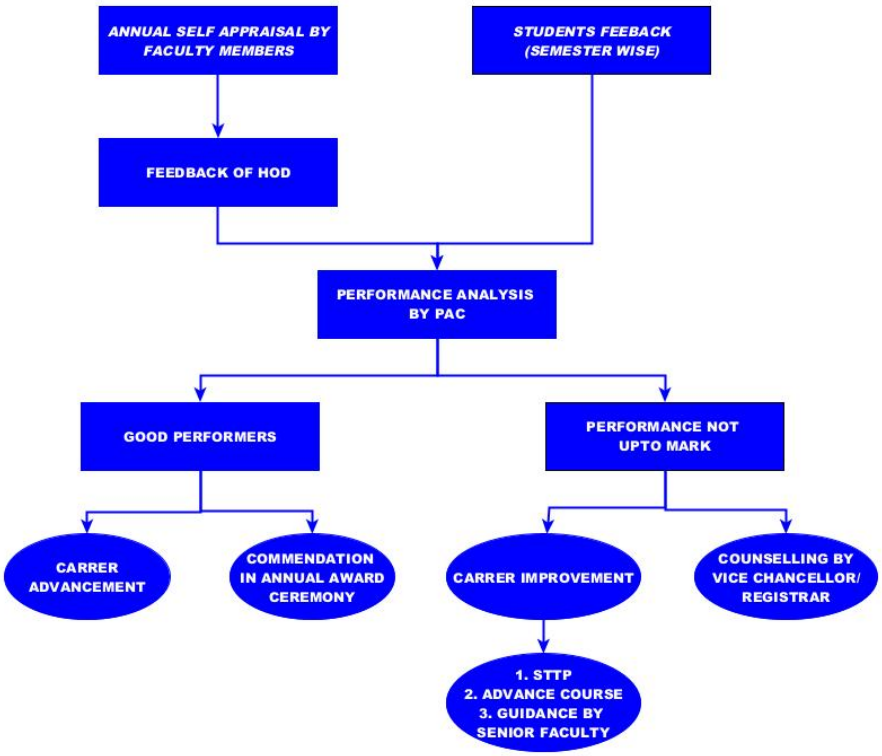

Figure 13: Block diagram of faculty appraisal system

Process Overview:

1. **Annual Self-Appraisal:**

   Faculty members submit a yearly self-appraisal detailing their achievements, teaching practices, research work, and contributions to the institution. This step promotes self-evaluation and goal setting.

2. **Feedback from Head of Department (HOD):**

   The HOD reviews the self-appraisal and provides structured feedback on performance, strengths, and areas of improvement, ensuring alignment with departmental goals.

3. **Student Feedback (Semester-wise):**

   Student feedback is collected at the end of each semester to assess teaching effectiveness, communication skills, and overall student satisfaction.

4. **Performance Analysis by PAC:**

   All inputs are analyzed by the Performance Appraisal Committee (PAC). The committee evaluates faculty performance using standardized criteria to ensure transparency and fairness.

5. **Performance Classification:**

   Based on the PAC analysis, faculty members are categorized into different categories.

6. **Outcomes and Actions:** 5.1 For Good Performers Career Advancement: Promotion and increased responsibilities Recognition: Commendation during the Annual Award Ceremony

5.2 For Faculty Requiring Improvement Career Improvement Plan, including: Short-Term Training Programs (STTP) Advanced Courses Mentorship by Senior Faculty Counselling Support: Guidance from the Vice Chancellor or Registrar 6. Continuous Improvement

This system operates as a continuous cycle, ensuring regular monitoring, feedback, and development of faculty members. It fosters a culture of excellence, accountability, and professional growth.

The structured evaluation and development framework ensures that faculty performance is assessed fairly and improved continuously. By combining recognition with developmental support, the system enhances both individual and institutional performance.

17 Service activities/Student Support

Silicon University recognizes that the successful implementation of Outcome-Based Education (OBE) extends beyond classroom teaching and academic assessment. To ensure holistic student development and effective attainment of Program Outcomes (POs), Program Specific Outcomes (PSOs), and Program Educational Objectives (PEOs), the university has established a wide range of student support activities that focus on co-curricular, extracurricular, and personal development domains.

A key focus area is student mentoring and counseling, where each student is assigned a faculty advisor(FA) who provides continuous guidance on academic planning, career choices, and personal development. Regular mentoring sessions help identify student challenges early and ensure timely intervention, thereby improving retention, performance, and overall well-being. In addition, professional counseling services are made available to support students facing stress, anxiety, or personal concerns.

The university also emphasizes skill development and employability enhancement programs. Workshops on communication skills, aptitude training, group discussions, interview preparation, and resume writing are regularly conducted. These initiatives help students develop essential soft skills required for industry readiness, aligning with OBE goals of producing competent graduates.

The university also supports sports and physical education activities to promote physical well-being and teamwork. Facilities and organized events in indoor and outdoor sports encourage discipline, resilience, and healthy competition among students.

Further, community engagement and social outreach programs such as NSS activities, environmental drives, and awareness campaigns instill a sense of social responsibility and ethical values. These initiatives help students connect classroom learning with real-world societal challenges, reinforcing experiential learning.

In addition, the institution facilitates internships, industrial visits, and guest lectures by industry experts, which bridge the gap between academia and industry expectations. These interactions expose students to practical applications of knowledge and emerging trends.

Overall, through a well-structured ecosystem of student support activities beyond academics, Silicon University ensures the holistic development of students. These initiatives play a crucial role in the effective implementation of Outcome-Based Education by nurturing competent, responsible, and industry-ready graduates.

17.1 Student Council

The Student Council of Silicon University plays a vital role in the effective implementation of Outcome-Based Education (OBE) by acting as a bridge between students and the institution. It provides a structured platform for student participation in academic planning, co-curricular activities, and institutional decision-making processes. Through active involvement in events,

feedback mechanisms, and peer engagement initiatives, the Student Council helps develop leadership, communication, teamwork, and organizational skills among students. It also facilitates the identification of student needs and concerns, ensuring timely support and continuous improvement in the teaching-learning environment. In the context of OBE, the Student Council contributes significantly to achieving Program Outcomes such as leadership qualities, ethical responsibility, and lifelong learning by promoting active engagement and accountability among students.

17.2 Clubs/Cells/Chapters

To encourage holistic development, Silicon University actively promotes clubs, societies, and student chapters in areas such as innovation, coding, entrepreneurship, cultural activities, and technical interests. Participation in these platforms nurtures leadership, teamwork, creativity, and problem-solving abilities. Events such as hackathons, technical fests, cultural festivals, and competitions provide experiential learning opportunities beyond academics.
The list of Clubs/Cells/Chapters at Silicon University are given below.

1. Achievers' Club
2. Technical Chapters (IEEE/ISTE)
3. Campus Coordination Committee(CCC) (for residency)
4. Food Court Cell
5. Social Awareness and Gender Equality for Woman (SAGE W) Cell
6. Eco-social Club
7. Cinemax Club
8. Sports Cell
9. Cultural Society of Silicon Cell (CSS)
10. Photography club & Creative Club
11. Meta Academics Cell
12. Cricket Club
13. Quiz Club
14. Health Club
15. Entrepreneurship development(ED) Cell
16. Social Media Cell
17. Publication Cell
18. Industry Interface Cell
19. Student Mentorship Cell
20. Silicon Innovation Promotion Cell(SIPC)
21. GDG (Google developer group) club
22. Alumni Cell
23. Value added course Cell (VAC)
24. NSS

18 Internal Quality Assurance Cell (IQAC)

The IQAC cell of silicon was established as per the guidelines of National Assessment and Accreditation Council (NAAC) for every accredited institution. The establishment of Internal Quality Assurance Cell (IQAC) at silicon after accredited institutions (after the first cycle) is a major step in pushing long-term quality standards.

As per the NAAC document, the IQAC should be a part of the institution's system and work towards realizing the goals of quality enhancement and sustenance. The prime task of the IQAC is to develop a system for conscious, consistent and catalytic improvement in the overall performance of institutions. The IQAC has to make a significant and meaningful contribution in the post-accreditation phase through channelizing the efforts and measures of an institution towards academic excellence.

In line with the objective stated in the NAAC document, The IQAC at silicon initiate, plan and supervise various activities that are necessary to increase the quality of the education imparted in an institution or college. The IQAC established in the college plays a crucial and significant role in maintaining quality standards in teaching, learning and evaluation. The IQAC has to ensure that whatever is done in the institution for "education" is done efficiently and effectively with high standards. The IQAC takes support from the already existing units and mechanisms that contribute to the overall growth of the institute.

18.1 Composition

The composition of IQAC has internal as well as some eminent external experts well known in their chosen domain of expertise. They attend IQAC meetings and give valuable suggestions. They are invited as experts to the departmental presentations. The composition of the IQAC is as follows:

1. Principal: chairman
2. Representative of the Trust; Member
3. Dean (Research): convenor
4. Deans and Controller of Examination of the institute: member
5. One external member (Academician)
6. One external member (industry expert)
7. Two parents' representative: Member
8. One alumni representative: Member
9. One Senior Faculty: Coordinator
10. Four senior faculties including HODs from the institution: member
11. Administrative officer: Member
12. One student representative: Member

Frequency of Meeting: the IQAC should meet twice in a year. i.e., Once in even semester and once in odd semester.

Membership duration: The membership of nominated members shall be for a period of three years.

Quorum: The quorum for the meeting shall be two-third of the total number of members. The agenda, minutes and Action Taken Reports are to be documented with official signatures and maintained both physically and electronically in a retrievable format.

18.2 Functions (Roles and Responsibilities):

The functions (Roles and responsibilities) of IQAC at silicon was defined in accordance with the objective set by the NAAC. The objective set by NAAC for IQAC are

- To develop a quality system for conscious, consistent and catalytic programed action to improve the academic and administrative performance of the Institute.
- To promote measures for institutional functioning towards quality enhancement through internalization of quality culture and institutionalization of best practices.

To achieve the above-mentioned objective the functions (Roles and responsibilities) of IQAC at silicon are defined below.

1. The IQAC will establish procedures and modalities to collect data and information on various aspects of institutional functioning.
2. It promotes co-curricular and extra-curricular activities in the college.
3. Ensuring timely, efficient and progressive performance of academic, administrative and research tasks;
4. To monitor the relevance and quality of academic and research programs;
5. Optimization and integration of modern methods of teaching and learning;
6. Ensuring the adequacy, maintenance and proper allocation of support structure and services;
7. Sharing of research findings and networking with other institutions in India and abroad.
8. Development and application of quality benchmarks/parameters for various academic and administrative activities of the institution;
9. Facilitating the creation of a learner-centric environment conducive to quality education and faculty maturation to adopt the required knowledge and technology for participatory teaching and learning process;
10. Dissemination of information on various quality parameters of higher education;
11. Organization of inter and intra institutional workshops, seminars on quality related themes and promotion of quality circles;
12. Documentation of the various programs/activities leading to quality improvement;
13. Acting as a nodal agency of the Institution for coordinating quality-related activities, including adoption and dissemination of best practices;
14. Development and maintenance of institutional database through DMS for the purpose of maintaining /enhancing the institutional quality;
15. Preparation of the Annual Quality Assurance Report (AQAR) as per guidelines and parameters of NAAC, to be submitted to NAAC.
16. Ensure enhancement and coordination among various activities of the institution and institutionalize all good practices;
17. Build an organised methodology of documentation and internal communication.

18.2.1 Goal Setting and Achievement

One of the main functions of the IQAC is to set goals and targets for different activities like research, student performance, CO-PO attainment and others at the beginning of the academic session and monitor the progress throughout the year. The following are the goals set after due planning for quality measures at the beginning of the academic session:

1. **Communication of objectives and targets:** The objectives and targets are communicated at the beginning of the academic session.

2. **Department Quality Monitoring System (DMS):**The DQMS format is duly filled by the respective departments and sent to the IQAC office at the start of the academic session. This includes goals set for all activities related to academics, research and consultancy during the academic session. DQMS also sets departmental targets for Publications, projects to be undertaken, extra-curricular and co-curricular activities, syllabus completion, student performance, CO-PO attainment and placements. The format is reviewed and fine-tuned periodically.

3. **Preparation of IQAC Calendar:** Annual IQAC calendar is prepared by the IQAC Convenor after due deliberation with the other members and it is placed before a full IQAC meeting for approval. Necessary changes are incorporated after discussion. Sincere efforts are made to adhere to the calendar.

18.2.2 Quality Parameters Monitoring

The IQAC continuously monitors the targets set by the department quality monitoring system. It reviews the progress every three months and takes necessary steps to facilitate the departments to achieve the set goals. The IQAC takes the following steps for quality parameter monitoring:

1. **Department quality monitoring System (DMS):** The DMS format is duly filled by the respective departments and sent to the IQAC office before the end of every three months. This includes all data related to academics, research and consultancy during this period. DQMS consists information about Publications, projects undertaken, extra-curricular and co-curricular activities, syllabus completion status, result analysis and placements during that month. The format is reviewed and fine-tuned periodically. A small committee consisting of only internal members of IQAC is in place to review this report after periodic visit to the concerned departments. Both these reports are placed before the biannual IQAC meetings for a complete discussion. Action Taken Report prepared by each academic department is discussed along with this and necessary suggestions for improvement are recommended by the learned members.

2. **Convening Biannual Review Meetings:** It was mandated that the IQAC should meet twice a year for quality parameter monitoring. Once during April for the even semester period and once during October for the odd semester period covered. Some slight rescheduling of this meeting is done depending on the unavoidable circumstances like non-publication of result/ delayed examinations or academic calendar.

3. **Self-Appraisal Report from faculty members:** Self-appraisal report is to be filled by the faculty members twice a year. The first one is for the period from January to June and the second one is for the period during July to December. The Performance Based Appraisal System (PBAS) deals with the analysis of the self-appraisal submitted by the faculty members. The same is analysed and relative scores are drawn. Areas of improvement are identified and discussed with the concerned faculty member.

4. **Students' feedback of the courses and the evaluation of teachers:** The feedback forms are circulated to the respective Schools at the beginning of the odd semester and at the end of the even semester. This report is fully discussed in the IQAC meetings and grievances of students are addressed. Suggestions are recommended for all round improvements in teaching learning and basis amenities.

5. **Institutional Best practices:** IQAC collects the best practices followed by each department at the beginning the academic year. All the best practices are compiled in the form of a book and published every academic year.

18.2.3 Academic Audit

The IQAC of Silicon conducts academic audit of the departments to monitor the progress in achieving the set goals and plan for the future. The departments are assessed based on a set of defined parameters covering Department Profile, Curriculum Design and Development, Infrastructure and Learning Resources, Research, Consultancy and Extension. Infrastructure & Learning Resources, Organization and Governance, Innovative Practices and Placement & Progression. IQAC helps in the conduct of academic audit. The academic audit in silicon is divided into two parts. Internal academic audit and External Academic and Administrative Audit

18.2.4 Internal Audit (Department Level):

The IQAC conducts internal academic of all department twice in a year. The IQAC sets up an internal audit committee for each department consisting of senior faculty members from other department. The audit committee does an extensive verification of all the departmental activities during the specified period and submit the report to the IQAC. The areas of concerns are also communicated by the auditors. The audit is done as per the laid down by National Assessment and Accreditation Council. The format for internal audit is provided below.

18.2.5 External Audit (Institute Level)

The IQAC also conducts external academic audit once a year. The IQAC invites eminent persons having due experience in academic activities and having experience in conducting different type of audit for academic institutions. The internal audit report is presented before the external auditor. The external auditor does an extensive verification of all the departmental activities during the specified period and submits the report to the IQAC. The areas of concerns are also communicated by the auditors. The audit is done as per the laid down by National Assessment and Accreditation. The external audit report is presented before the IQAC for deliberation and preparing due course of action for different activities.+

18.2.6 Reporting and Compliance

The IQAC at silicon takes all necessary steps for fulfilling the requirement of statutory authorities like NAAC, NBA, AICTE, NIRF, and University. It prepares different compliance report and self-assessment report as per the guideline set by different statutory authorities.

1. Collation of information for Ranking Agencies: IQAC helps in collating the information for the questionnaire provided by the ranking surveys like NIRF and other similar organisations.

2. Department presentations: IQAC takes the lead in organizing department presentations at the end of the academic year as per the criteria prescribed by NAAC.

3. Facilitating process of documentation: The overall documentation is effectively maintained by IQAC which helps in sharing of the information as and when required by the regulatory authorities