MARIAN ENGINEERING COLLEGE

TRIVANDRUM, KERALA

INSTITUTIONAL DEVELOPMENT PLAN (IDP)

2025–2030

Strategic Roadmap for Autonomous Institutional Growth

1. Executive Summary

Marian Engineering College (MEC) located in Kazhakoottam, Trivandrum, Kerala, India, was started in 2001 under the Trivandrum Social Service Society established on 7th June 1960 under the Travancore-Cochin Literary, Scientific and Charitable Societies Act, XII of 1955. The college is affiliated with APJ Abdul Kalam Technological University (KTU) and approved by the All India Council for Technical Education (AICTE). It offers undergraduate programs in various disciplines of engineering such as Civil, Mechanical, Electrical & Electronics, Electronics & Communication, Computer Science, and Artificial Intelligence and Machine Learning, Electronics and Computer Engineering. The college also provides postgraduate courses in selected specializations.

The college is renowned for its modern infrastructure, which includes well-equipped laboratories, a state-of-the-art library, advanced workshops, and hostel facilities and playground for students. It emphasizes a balanced approach to education, focusing on academic excellence, ethical values, and practical skills development. Marian Engineering College also promotes industry collaborations, research initiatives, and placement activities to ensure holistic development and career readiness among its students.

The management team combines spiritual guidance, academic leadership, and administrative expertise to guide the institution's development and operations. Marian Engineering College has a well-structured governance plan designed to ensure efficient management and administration of the institution. The governance plan features a decentralized organizational setup to implement academic, administrative, and financial policies effectively

2. Objectives

1. To provide quality technical education that equips students with strong theoretical knowledge and practical skills to meet global technological challenges.

2. To foster innovation, creativity, and research aptitude among students and faculty to develop sustainable solutions for societal needs.

3. To inculcate ethical values, professional integrity, and a sense of social responsibility in students for their overall moral and personal development.

4. To create a learner-centered environment that encourages critical thinking, teamwork, and lifelong learning.

5. To strengthen industry–institute interaction for enhancing employability, entrepreneurship, and real-world exposure.

6. To promote community engagement and social outreach programs that contributes to the welfare of society.

3. SWOC

Institutional Strengths

❖ Marian Engineering College has developed a strong academic ecosystem supported by experienced faculty members, modern infrastructure, and a commitment to quality engineering education.

❖ Several academic programs are accredited and the institution continuously works towards improving academic standards through outcome-based education and continuous quality improvement practices.

❖ The institution has an active innovation and entrepreneurship ecosystem supported by an Innovation and Entrepreneurship Development Centre (IEDC), enabling students to develop innovative ideas, prototypes, and startup ventures.

❖ The presence of specialized centres such as the Center of Excellence in Artificial Intelligence and Machine Learning provides students with exposure to emerging technologies and industry-relevant skills.

❖ Marian Engineering College actively promotes project-based learning and interdisciplinary collaboration, encouraging students to work on innovative technical solutions and real-world engineering challenges.

❖ The institution maintains strong industry engagement through MoUs and collaborative training programs, which help bridge the gap between academic learning and industry requirements.

❖ A dedicated placement and training cell focuses on skill development, career guidance, and placement opportunities for students through structured training programs and industry interactions.

❖ The college has established innovation labs through MODROB scheme, project spaces, and prototyping facilities that enable students to convert ideas into functional prototypes and products.

❖ The institution has a supportive management and transparent governance structure that facilitates academic development, research initiatives, and institutional growth.

❖ Marian Engineering College provides a conducive learning environment with a green campus and adequate facilities for academic, co-curricular, and extracurricular activities.

❖ Active engagement with industries and research organizations has helped strengthen internships, technical training programs, and collaborative research initiatives.

Institutional Weaknesses

❖ Limited availability of large-scale externally funded research projects compared to premier research institutions.

❖ Industry-sponsored laboratories and long-term collaborative research facilities need further expansion.

❖ International academic collaborations and faculty exchange programs are currently limited and need to be strengthened.

❖ Research output in terms of high-impact publications and patents needs to be further increased.

❖ There is a need for greater interdisciplinary academic programs that integrate emerging technology domains.

Institutional Opportunities

❖ The autonomous status of the institution provides the opportunity to redesign curriculum, introduce interdisciplinary programs, and implement innovative academic practices.

❖ Rapid growth in emerging technology areas such as Artificial Intelligence, Data Science, Cybersecurity, and Renewable Energy creates opportunities for new academic programs and research initiatives.

❖ The strong innovation ecosystem and incubation initiatives provide opportunities for developing student startups and technology-driven entrepreneurship ventures.

❖ Expanding partnerships with industries can enable joint research, internships, and industry-supported laboratories.

❖ Opportunities exist for developing online learning resources and digital content for national platforms such as SWAYAM.

❖ Strengthening the alumni network can support mentoring, industry collaborations, and institutional development initiatives.

❖ Increased government focus on innovation, research, and startup ecosystems offers new opportunities for research funding and incubation support.

Institutional Challenges

❖ The rapid advancement of technology requires continuous updating of curriculum, laboratory facilities, and faculty expertise.

❖ Increasing competition from autonomous institutions, private universities, and national-level institutes.

❖ Student migration to institutions outside the state and abroad affects admission patterns in engineering institutions.

❖ Ensuring consistent placement opportunities across all engineering disciplines in a dynamic employment market.

❖ Sustaining research funding and maintaining high research productivity in a competitive research environment.

4. Vision 2030

To transform Marian Engineering College into a nationally recognized autonomous engineering institution known for excellence in industry-integrated education, impactful research, innovation-driven entrepreneurship, and global academic collaboration.

5. Strategic Objectives (2025–2030)

5a. Build a flexible and industry-aligned curriculum under academic autonomy.

Marian Engineering College plans to implement flexible credit-based learning that allows students to choose electives, minors, and interdisciplinary subjects. The curriculum will emphasize practical learning through projects, internships, and industry-certified courses. Continuous curriculum revision mechanisms will be introduced with inputs from industry experts and alumni. This approach will ensure that graduates possess both strong theoretical knowledge and industry-relevant skills.

5b. Strengthening research output and funded projects.

The institution aims to significantly improve its research culture and output during the next five years. Faculty members will be encouraged to publish high-quality research papers in reputed journals and conferences. Institutional support will be provided for writing research proposals and applying for grants from national and international funding agencies. Collaborative research with industries and other academic institutions will be promoted to address real-world technological challenges. Incentives and recognition will be introduced to motivate faculty members to actively engage in research and innovation.

5c. Developing a strong innovation and startup ecosystem.

The Innovation and Entrepreneurship Development Centre (IEDC), which is already rated as one of the top IEDC in the state will be further strengthened to support idea development and startup incubation. Students will be encouraged to participate in hackathons, innovation challenges, and prototype development programs. Mentorship from industry experts and successful entrepreneurs will be integrated into the innovation ecosystem. Dedicated infrastructure and seed support will be provided to help student startups transform innovative ideas into viable ventures.

5d. Expanding industry collaboration and employability outcomes.

The institution will strengthen partnerships with industries to enhance practical exposure and employability of students. Industry experts will be involved in curriculum design, guest lectures, and mentoring of student projects. Collaborative initiatives such as industry-sponsored laboratories, internships, and live projects will be expanded. Professional certification programs aligned with industry requirements will also be integrated into academic programs. These initiatives will ensure that students graduate with the technical competencies and professional skills required by modern industries

5e. Improving national visibility through rankings, accreditation, and partnerships.

The institution will actively work towards improving its standing in national and international academic rankings. Strategic initiatives will be undertaken to enhance performance in parameters such as research output, industry collaboration, and graduate outcomes. Efforts will be made to strengthen accreditation status through continuous quality improvement initiatives. The college will also pursue partnerships with reputed academic institutions and research organizations. These initiatives will enhance institutional visibility, credibility, and academic reputation.

5f Building leadership capacity among faculty members.

College will organize leadership development programs to prepare senior faculty members for administrative and academic leadership roles. Training programs will focus on institutional governance, strategic planning, and academic management. Opportunities for

industry exposure and collaborative academic engagements will also be provided. By nurturing leadership capabilities among faculty members, the institution will ensure effective implementation of its long-term development vision.

6. Research Development Targets

As an autonomous institution, Marian Engineering College aims to significantly strengthen its research ecosystem by encouraging faculty and students to actively engage in research, development, and innovation activities. The institution will focus on increasing high-quality research publications, attracting funded research projects, promoting interdisciplinary research collaborations, and encouraging patent generation. By creating a supportive environment with appropriate infrastructure, incentives, and collaborations, the college seeks to build a vibrant research culture that contributes to technological advancement and addresses real-world societal challenges. The following targets outline the strategic goals for research development during the period 2025–2030.

6a. Significant increase in Scopus indexed publications

The institution aims to significantly increase the number of research publications in reputed national and international journals indexed in recognized databases such as Scopus and Web of Science. Faculty members will be encouraged to undertake research activities aligned with emerging technological domains and societal needs. Internal support mechanisms such as research mentoring, writing workshops, and publication incentives will be introduced. Collaborative research among departments will also be promoted to improve the quality and impact of publications. These efforts will contribute to enhancing the academic reputation and research visibility of the institution. The minimum target will be at least three times of current publications in the first year and at least five times in the next three years.

6b. Funded research projects

College will actively encourage faculty members to apply for research grants from national and international funding agencies such as government bodies, research councils, and industry partners. Training sessions and proposal development workshops will be

organized to help faculty prepare competitive research proposals. Institutional support will be provided for project planning, documentation, and administrative processes related to research funding. Collaborative projects with industries and research organizations will also be encouraged to address real-world technological challenges. Increasing the number of funded projects will strengthen the institution's research capability and infrastructure. The first year target is at least 15 funded project in the first two years

6c. Enhancement in number of IPR's

As 2026 marks the silver jubilee year of MEC, we plans for filing 25 patent applications. Faculty members and student innovators will be encouraged to convert their research outcomes into patentable technologies. Institutional financial support and guidance will be provided for filing patents and protecting intellectual property. This initiative will help transform innovative ideas into tangible technological solutions with potential societal and industrial applications. The target for 2030 will be a cumulative 100 IPR's.

6d. Establishment of Centers of Excellence

To strengthen research capabilities in emerging technological areas, the institution plans to establish specialized Centers of Excellence in selected domains. These centers will serve as hubs for advanced research, industry collaboration, and technology development. Faculty members, researchers, and students will work together on interdisciplinary projects within these centers. Industry partners will also be involved in supporting research activities and providing practical insights into technological challenges. The planned centers are

- Center for Integrated Coastal Development
- Center for Biomedical Research
- Center for Coastal Engineering and Management
- Center for Software Development
- Center for Energy Research
- Center for Product Design and Development
- Marian Center for Continuing Education.

- Center for Composite Research.

6e. Strengthening Research Infrastructure and Collaboration

The institution will invest in modern laboratory facilities, research equipment, and digital resources to support advanced research activities. Partnerships with industries, research organizations, and universities will be strengthened to facilitate collaborative projects and knowledge exchange. Opportunities for faculty and students to participate in national and international conferences, workshops, and collaborative research initiatives will also be encouraged. These efforts will create a vibrant research environment that fosters innovation and interdisciplinary collaboration.

7. Innovation and Entrepreneurship Ecosystem

Marian Engineering College aims to create a vibrant ecosystem that encourages students and faculty to develop innovative ideas and transform them into practical solutions and entrepreneurial ventures. By strengthening institutional support systems, providing mentorship from industry experts, and facilitating access to incubation and funding

opportunities, the college seeks to nurture a culture of creativity, experimentation, and problem-solving. The innovation ecosystem will also promote interdisciplinary collaboration and real-world problem solving, enabling students to contribute to technological advancement and societal development. The following initiatives outline the strategic efforts to build a strong innovation and entrepreneurship ecosystem during the period 2025–2030.

7a. Strengthen Innovation and Entrepreneurship Development Centre (IEDC)

The institution will strengthen the activities of the IEDC by organizing regular workshops, ideation programs, and innovation challenges that encourage students to develop creative solutions to real-world problems. Faculty mentors and industry experts will be actively involved in guiding student innovators throughout the idea development process. The IEDC will also facilitate prototype development and support students in transforming their innovative ideas into viable projects. Strengthening the IEDC will help establish a sustainable innovation culture within the campus.

7b. Annual hackathons and innovation challenges

Hackathons and innovation challenges will be organized regularly to encourage students to work collaboratively on solving real-world technological and societal problems. These events will provide students with opportunities to apply their technical knowledge, creativity, and teamwork skills in a competitive and stimulating environment. Industry partners and technical experts will be invited to provide problem statements and mentor participating teams. Such events will also help identify promising ideas that can be further developed into research projects or startup ventures. Continuous engagement through hackathons will strengthen the innovation mindset among students.

7c. Startup incubation support

The institution will provide structured support for students and faculty interested in launching startup ventures. Incubation support will include access to workspace, mentoring from industry experts, and guidance on business model development and market validation. Students will be encouraged to convert innovative project ideas into startup opportunities

through institutional incubation facilities. The institution will also facilitate connections with external startup ecosystems, incubators, and funding agencies. This initiative will help transform innovative ideas into sustainable entrepreneurial ventures.

7d. Industry mentoring for startup founders

Industry mentorship will be integrated into the innovation ecosystem to provide students with practical insights and professional guidance. Experienced entrepreneurs, industry professionals, and technical experts will mentor student teams working on innovative projects and startup ideas. Mentorship programs will help students refine their ideas, understand market requirements, and develop practical implementation strategies. Regular interactions with industry mentors will bridge the gap between academic innovation and real-world technological applications.

7e. Creation of a Student Innovation Fund

To support promising ideas and early-stage prototypes, the institution will establish a Student Innovation Fund. This fund will provide seed support for student teams to develop prototypes, conduct experiments, and validate their innovative concepts. Selected student projects with high potential will receive financial assistance and mentorship to further develop their ideas. The innovation fund will also encourage students to take risks and experiment with new technological solutions. Providing early-stage financial support will significantly enhance the likelihood of successful innovation outcomes and entrepreneurial ventures.

8. Academic transformation Strategy

ACADEMIC TRANSFORMATION STRATEGY

Academic transformation is a key priority for Marian Engineering College as it begins its journey as an autonomous institution. Autonomy provides the flexibility to redesign academic programs in a manner that responds effectively to emerging technological trends, industry requirements, and the evolving expectations of students. The institution aims to move beyond conventional teaching methods and adopt innovative academic practices that promote experiential learning, interdisciplinary exposure, and problem-solving abilities. Through curriculum modernization, integration of emerging technologies, and stronger industry engagement, the academic ecosystem will be strengthened to produce competent and socially responsible engineering graduates. The following strategic initiatives outline the major steps planned to transform the academic framework of the institution during the period 2025–2030

8a. Outcome Based Education framework

College will strengthen the implementation of Outcome-Based Education (OBE) to ensure that teaching and learning processes are aligned with clearly defined program outcomes and course outcomes. Faculty members will design courses that focus on measurable

learning outcomes and continuous improvement. Assessment methods will be revised to evaluate analytical ability, problem-solving skills, and practical knowledge. Regular program reviews will be conducted using outcome attainment data to improve academic effectiveness. This approach will ensure that graduates possess competencies required by industry and society

8b. Introduction of Minor and Honors degree programs

To provide academic flexibility and interdisciplinary exposure, the institution will introduce Minor and Honours degree programs under the autonomous framework. Students will have the opportunity to pursue a minor specialization in emerging fields such as Artificial Intelligence, Data Science, Robotics, Cybersecurity, and Renewable Energy. Honours programs will be designed for academically strong students who wish to pursue advanced learning and research-oriented studies. These programs will enhance the academic depth and career prospects of students. The introduction of such programs will also align the institution with modern global education practices.

8c. Interdisciplinary electives across departments

College will introduce interdisciplinary elective courses that allow students to learn concepts beyond their core branch of study. Students from mechanical, electronics, computer science, and other departments will have opportunities to work together on integrated projects. Interdisciplinary learning will also be encouraged through joint laboratory activities and project work. Such initiatives will help students develop broader technical perspectives and enhance innovation capabilities.

8d. Project-based learning from early semesters

To enhance practical learning and innovation, project-based learning will be integrated from the early semesters of the academic program. Students will be encouraged to work on small projects that apply theoretical knowledge to real-world problems. Faculty mentors will guide students in problem identification, design thinking, and prototype development. These projects will gradually evolve into larger capstone projects in the final year.

8e. Mandatory industry internship credits

Institution will introduce mandatory internship credits within the academic curriculum to ensure that every student gains practical experience. Structured internship programs will be developed in collaboration with industry partners. Students will be evaluated based on their performance, project outcomes, and professional learning during the internship period.

9. Industry Collaboration Model

Marian Engineering College aims to build long-term partnerships with industries to enhance practical learning, research collaboration, and employability outcomes for students. Through structured engagement with industry partners, the institution seeks to integrate real-world experiences into academic programs and promote knowledge exchange between academia and industry. These collaborations will include industry-supported laboratories, internships, joint research initiatives, and professional training programs. The following strategies outline the framework through which Marian

Engineering College will strengthen its industry engagement during the period 2025–2030. Industry collaboration will be strengthened through:

• Industry-supported laboratories

• Joint research projects

• Industry-certified training programs

• Internship pipelines

• Live project collaborations

10. Faculty Leadership and Capacity Development

As Marian Engineering College progresses as an autonomous institution, strengthening the professional capabilities and leadership potential of faculty members becomes a key priority. The institution aims to create a supportive environment that encourages continuous learning, research engagement, and academic leadership among faculty.

Through structured training programs, industry exposure, research support, and leadership development initiatives, the college will empower faculty members to take active roles in academic innovation and institutional governance. The following initiatives outline the strategic efforts to enhance faculty leadership and capacity development

10a. Leadership development training for senior faculty

The institution will organize structured leadership development programs to prepare faculty members for academic and administrative leadership roles. These programs will focus on areas such as strategic planning, institutional governance, decision-making, and team management. Senior faculty members will be encouraged to participate in national and international leadership training initiatives conducted by reputed academic organizations. Such programs will help faculty members develop the necessary skills to effectively lead departments, academic committees, and institutional initiatives.

10b. Industry immersion programs

The institution will regularly organize Faculty Development Programs, workshops, and training sessions in emerging areas of engineering and education. These programs will also focus on innovative teaching methodologies, digital learning tools, and outcome-based education practices. Collaboration with industry experts and reputed academic institutions will further enhance the quality of these training initiatives.

10c. International academic collaborations

Marian Engineering College will encourage faculty members to engage in international academic collaborations with universities, research institutions, and industry partners. Opportunities for joint research projects, faculty exchange programs, and participation in international conferences will be explored.

10d. Faculty innovation and research incentives

Reward systems of faculty achievements will be made as per policies, for involvement of activities in this area.

11. Infrastructure Development Plan

As Marian Engineering College progresses as an autonomous institution, strengthening its physical and digital infrastructure will be a key priority. The institution aims to develop advanced laboratories, smart classrooms, innovation spaces, and digital learning facilities that support contemporary engineering education and research activities. Infrastructure development will also focus on creating an environment that encourages collaboration, creativity, and technological experimentation among students and faculty. Major infrastructure initiatives include:

• Green & Carbon Neutral Campus.

• Smart and paperless campus.

• Advanced laboratories for emerging technologies

• Expansion of digital library resources

• Startup incubation and innovation hub

12. Institutional Branding Strategy

Marian Engineering College aims to strengthen its visibility, reputation, and outreach to ensure that the institution continues to attract motivated and capable students. With increasing competition among engineering institutions and the trend of student migration to institutions outside the state, it is essential to highlight the unique strengths, academic quality, and career opportunities offered by the college. Through strategic outreach programs, strong industry linkages, and effective communication of institutional achievements, Marian Engineering College will position itself as a preferred destination for quality engineering education To address student migration and strengthen admissions:

13. KPI Monitoring Dashboard

Marian Engineering College will establish a structured Key Performance Indicator (KPI) framework to track the performance of the institution in areas such as academics, research, innovation, industry collaboration, and student development. These indicators will help measure the effectiveness of strategic initiatives and ensure that institutional goals are being achieved within the planned timeframe. Regular review of KPIs will enable timely identification of gaps and facilitate corrective actions where necessary. The KPI monitoring system will therefore play a crucial role in ensuring transparency, accountability, and continuous improvement in the institutional development process Key performance indicators will be monitored annually and the following KPI's will be implemented.
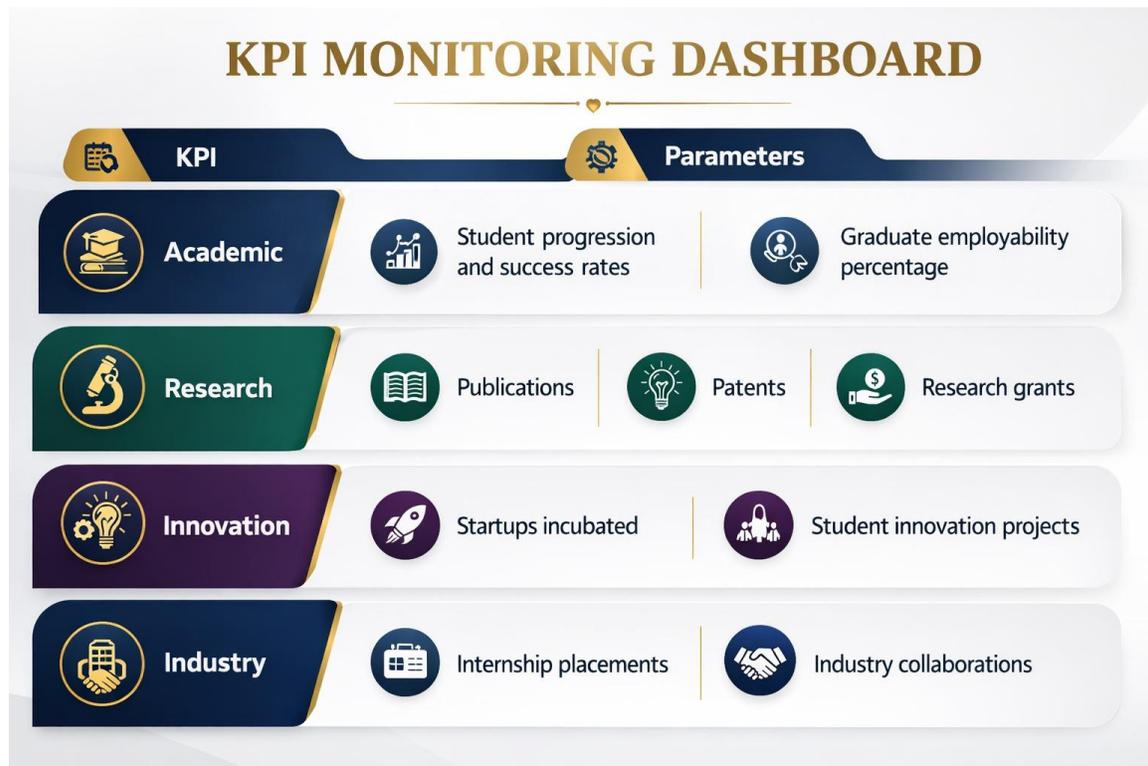
14. Implementation Framework

Marian Engineering College will establish a systematic approach to coordinate, implement, and review the various strategic initiatives outlined in this plan. Dedicated committees and administrative structures will be responsible for guiding and monitoring progress across academic, research, and institutional development activities. Regular review meetings and performance evaluations will ensure that the planned objectives are achieved within the stipulated timeframe. This structured implementation framework will ensure efficient utilization of resources, transparency in decision-making, and sustained progress towards the institutional vision The Institutional Strategic Planning Committee will oversees implementation.

Mechanisms:

• Annual IDP review
• Department-level action plans
• KPI tracking dashboard
• External advisory board reviews

15. Expected Outcomes by 2030

The Institutional Development Plan (2025–2030) outlines the strategic direction for Marian Engineering College as it advances in its journey as an autonomous institution. The plan focuses on strengthening academic excellence, enhancing research and innovation, promoting entrepreneurship, and building strong industry collaborations to ensure that the institution remains responsive to the evolving needs of society and the engineering profession.

Through initiatives such as curriculum transformation, research development, innovation support, faculty capacity building, and infrastructure enhancement, the college aims to create a dynamic academic ecosystem that nurtures skilled, responsible, and innovative engineering graduates. The emphasis on industry engagement and student development will further ensure that graduates are well prepared to contribute effectively to technological advancement and national development.

The successful implementation of this Institutional Development Plan will depend on active participation and commitment from faculty members, students, industry partners, alumni, and institutional leadership. With the structured implementation framework and continuous monitoring mechanisms described in the previous section, the institution will regularly review its progress and make necessary improvements to achieve the planned objectives.

By effectively implementing the strategies outlined in this plan, Marian Engineering College aims to strengthen its academic reputation, enhance research output, and establish itself as a leading institution for engineering education, innovation, and societal contribution by the year 2030. The execution of IDP will lead the institution to achieve

• Recognition as a leading autonomous engineering college in Kerala
• Strong industry-academia ecosystem
• Significant research and innovation output
• Increased student employability and startup culture
• Improved national rankings and academic reputation