Cochin University of Science and Technology

REPORT OF THE ACADEMIC REVIEW COMMITTEE

Volume – I

Prepared by

1 Dr. K. George Thomas, Professor and Dean, Faculty of Affairs, IISER, Thiruvananthapuram (Chairman of the Committee).

2 Dr. Rajeev K. Sukumaran, Senior Principal Scientist, CSIR-NIIST, Thiruvananthapuram and Professor, Academy of Scientific and Innovative Research (AcSIR), Ghaziabad.

3 Dr. C. Krishna Mohan, Professor, IIT Hyderabad.

4 Dr. Rejie George Pallathitta, Professor, IIM Bangalore.

Coordinated by

The Internal Quality Assurance (IQAC) of CUSAT

March 2025

TABLE OF CONTENTS

Chapter 1

PREAMBLE

1.1 Background

Cochin University of Science and Technology (CUSAT) has long been a distinguished institution in India, renowned for its contributions to science, technology, and management education. However, in the rapidly evolving global landscape of higher education, academic institutions must continuously adapt to remain relevant and competitive. The demand for interdisciplinary knowledge, industry-aligned curricula, digital transformation, and international collaborations necessitates a strategic academic restructuring of CUSAT. By modernizing its academic framework, CUSAT can enhance student employability, research output, and institutional reputation.

With this vision in mind, CUSAT ordered the constitution of a higher-level committee to review the existing programs, courses and curriculum offered by the University in the context of recent technological advances that have become prevalent in our environment (Annexure I). This document therefore attempts to provide a roadmap to chart out the University's vision to become a leading academic institution in the country with a focus on innovation and excellence and incorporate the best national and global practices in order to cement and enhance CUSAT's standing as being one of the leading Universities in the country.

1.2 Context of the Review

The current review of CUSAT's academic programs and procedures is being conducted at a time of substantive changes in the nature of education and the mechanisms of delivery as far the sector is concerned. The New Education Policy (2020) commissioned by the Ministry of Education (MoE), Government of India has brought out a need to revisit several aspects of the structure, governance, and the curriculum of courses in higher educational institutions in India. The Commission for Reforms in Higher Education (2022) instituted by the Department of Higher Education, Government of Kerala [1] has also brought out the need for reviewing University governance, revamping the higher education ecosystem, curriculum reform, improving digital infrastructure and mobilising external resources. Coupled with the above, there is

the concern about an increasing trend of Indian students going abroad for higher education. Apart from the loss of talented young individuals in their prime to foreign shores since a significant proportion of these students do not return back to India or the state of Kerala post their education abroad, there is a huge brain drain and foreign exchange outgo as a consequence of student migration outside the country. Some of these changes associated with the higher education landscape had already begun prior to the COVID-19 pandemic, but they have witnessed an accelerated pace since then.

In addition to the contextual developments highlighted above, the field of higher education is constantly evolving and the way it is practised is rapidly changing with the acquisition of new knowledge, developments in infrastructure and equipment, means of acquiring and dissemination of data, resource availability and social demands. Traditionally, education in the Indian Universities have followed the conventional approach of teacher centric instructions, textbook reading, memorizing and the cataloguing and processing of factual information, also aided by experimental methods. This is more of a one-way flow of information and the students are compelled to follow only what the curriculum demands. Such learning often has a heavy penalty on the critical thinking ability, creativity and problem-solving skills of students, though it equips them with an understanding of the basic scientific principles. Unfortunately, the students completing the higher education are often ill equipped to handle real life problems and are left with low employability skills.

Education policy makers across the globe have realized this long enough and worldwide, there have been concerted efforts in moving science education from memorizing facts to conceptual understanding and developing problem solving skills, thereby generating a human resource that can propel development through research and applying their knowledge. From conventional teaching methods to hands-on trainings, inquisitive learning, phenomena-based learning, STEM (Science, Technology, Engineering and Mathematics) education and Digital learning that are also inclusive, incorporating the student backgrounds are becoming the norm. Apparently, such an education system is essential for cultivating a modern workforce which can adapt to the challenging demands of this century.

Science has witnessed exponential growth, especially in the last few decades. From Gregor Mendel's work with peas exploring the principles of heredity to whole

genome sequencing and large-scale gene expression analyses, precision editing of genes using molecular tools, and from the discovery of electrons by JJ Thomson to searching new particles like the Higgs Boson using the 27 km long Large Hadron Collider stand testimony to these changes. With the advent of the internet, the way we acquire and disseminate science have been drastically redefined, accelerating the growth of science. Improvements in computational architecture and data processing have made knowledge affordable and accessible even to the common man, and data has now become the decisive element that dictates the economy and the quality of life. Advances in artificial intelligence and machine learning have enabled us to think and explore possibilities which were unimaginable even in the past decade. At the same time, we are at a crossroads now, since these scientific advances that contributed to human growth and industrialization has also led to the rapid destruction of our environment threatening the very existence of life on the planet. However, it is science again that one must depend upon to provide solutions to global crises, such as global warming and the emergence of new pandemics.

In the field of management education, there have been significant changes in organizational expectations with regard to the graduates from higher education institutions due to the enhancement of digitalization and the widespread application of analytical tools and techniques. In addition, there is greater awareness and scrutiny associated with how the organization's various activities impinge on the environment and societal expectations concerning the organization's behaviour regarding the same. Furthermore, questions associated with business ethics and the governance of the corporation have risen in prominence. Similar concerns have been expressed in other fields of study as well.

CUSAT has evolved into a top ranked research University in India, providing pioneering research in nine Faculties viz. Engineering, Environmental Studies, Humanities, Law, Marine Sciences, Medical Sciences and Technology, Science, Social Sciences and Technology. With 33 teaching departments and 26 centres of excellence in cutting-edge technology domains, CUSAT pioneered the interdisciplinary academic and research programs in the state of Kerala through its flagship programs in the domain of Marine Sciences, Engineering Sciences, and Environmental Sciences. The core basic science and technology programs stood as the main pillar of support to these initiatives

to achieve critical goals in these programs. CUSAT has research collaborations with many well-established premier research institutions in the country as well as Universities abroad. Over the course of 50 years, CUSAT has accumulated numerous research facilities and has undertaken several crucial R&D translational research projects. Departments have built a strong history of implementing funded projects and grants from agencies such as the Department of Science and Technology (DST), Defence Research and Development Organisation (DRDO) Department of Biotechnology (DBT), Indian Council of Medical Research (ICMR), Ministry of Earth Sciences (MoES), Kerala State Council for Science, Technology and Environment (KSCSTE) among others. Research Infrastructure was created through infrastructure grants like the Department of Science and Technology-Fund for Improvement of S&T Infrastructure (DST-FIST), Department of Science and Technology-Promotion of University Research and Scientific Excellence (DST – PURSE), UGC Special Assistance Programme (UGC-SAP) to name a few. Recently, the Government of Kerala has supported CUSAT though KIIFB by way of providing built – up space and modern equipment. It has more than 7600 students in the campus including more than 1260 PhD scholars and more than 2700 PG students.

The committee is proud to place on record that CUSAT is highly ranked under the University category in the National Institutional Ranking Framework (NIRF) of the MoE[2]. Notably, CUSAT's position has commendably improved during the period from 2020 to 2024, achieving the following rankings: 62nd in 2020, 44th in 2021, 41st in 2022, 37th in 2023, and 34th in 2024.

Nevertheless, in view of the important structural shifts indicated earlier, in the educational environment, the need for CUSAT to be adequately conversant with these important trends, and to be adequately equipped for the requirements of the future marketplace assumes paramount importance. With its potential to break into the top 10, the committee hopes that the academic and administrative recommendations provided here will further enhance CUSAT's standing in the NIRF.

In the sections that follow, we describe the process that we followed in discerning the key issues given the terms of reference for the committee and conclude with our recommendations on the way forward for CUSAT. Our recommendations follow a two-pronged approach. Firstly, we attempted to translate some of the practices

prevalent in leading national institutions such the IITs, IISERs, and IIMs with adaptations suitable to the context at CUSAT. Secondly, we put forth suggestions for enhancing scale with regard to some of the courses in order to optimize resource utilization and leverage in-house academic capabilities fully, while simultaneously also suggesting measures to further research output in the respective departments. Thirdly, we suggest a series of measures aimed at the near term and we also put forth some suggestions for the longer term to enable CUSAT to fulfil its ambition to be one of leading national higher educational institutions at the cutting edge of excellence and innovation.

The goal of this report is to enhance the national and international visibility of CUSAT and to propose measures that will transform the University into a vibrant center for scholarship, innovation, and knowledge generation, serving undergraduate, postgraduate, doctoral, and postdoctoral students. To this end, CUSAT should augment its current activities and foster a state-of-the-art environment that offers cutting-edge research opportunities, advanced educational programs, and promotes interdisciplinary collaboration within a thriving academic atmosphere. This initiative will empower students and researchers to excel in their respective fields, advance technological progress, and address complex challenges at both national and global levels.

Volume 1 of the report presents our broad philosophy and thought process associated with achieving these goals, while *Volume 2* represents the compilation of the various inputs which were obtained from the various faculties, schools, departments and centres at CUSAT during our visits and interactions with the faculty colleagues. In order to implement the various suggestions within the ambit of the philosophy and thrust of the report as illustrated in *Volume 1* of the report, the committee recommends that a working group be set up in CUSAT to develop an Institution Development Plan (IDP) modelled on the guidelines provided by the UGC. The committee believes that suggestions provided in *Volume 1* would provide the required impetus for the IDP development exercise.

It is hoped that these measures will help in transforming CUSAT into a dynamic hub of scholarship, knowledge creation, and innovation that caters to undergraduate, postgraduate, and doctoral students. It will further CUSAT's aims to provide cutting-

edge teaching and research opportunities, advanced educational programs, and interdisciplinary collaboration by fostering a vibrant academic environment. This transformation should enable students and scholars to excel in their fields, drive technological advancements, and contribute to solving complex national and global challenges.

1.3 Members of the Committee and Terms of Reference [3]

The members of the review committee tasked with review are:

1. Dr. K. George Thomas, Professor and Dean, Faculty of Affairs, IISER, Thiruvananthapuram (Chairman of the Committee).
2. Dr. Rajeev K. Sukumaran, Senior Principal Scientist, CSIR-NIIST, Thiruvananthapuram and Professor, Academy of Scientific and Innovative Research (AcSIR), Ghaziabad.
3. Dr. C. Krishna Mohan, Professor, IIT Hyderabad.
4. Dr. Rejie George Pallathitta, Professor, IIM Bangalore.

The Internal Quality Assurance (IQAC) cell of CUSAT was entrusted with the coordination work between the committee and CUSAT.

The terms of reference assigned to the committee are

To undertake a comprehensive review of CUSAT's activities regarding the following below:

1. To review the existing academic programs.
2. To propose new academic programs in emerging and futuristic areas
3. To restructure existing academic systems to introduce flexibility.
4. To strengthen institute-industry interactions.
5. Introduce new structures, systems, and processes, if required to acquire goals.
6. Mechanisms to address the skill gap, promotion of innovations, translational research and the start-up ecosystem.

Chapter 2

METHODOLOGY

Our methodology for arriving at the principal issues that need attention in order to provide our recommendations involved the following steps.

a We had a series of online meetings ***[details provided in Annexure IV]*** which provided the necessary context and background and wherein we deliberated on our approach for moving forward with the review.

b The Committee had two in person meetings at CUSAT ***[details provided in Annexure II & III]*** wherein we had the opportunity for extensive discussions with various stakeholders associated with CUSAT. The in-person meetings involved extensive meetings with the Syndicate members, Academic Council members, Vice-Chancellor, Deans, Department Heads, Statutory Officers and all the senior functionaries of the University.

c Prior to the visits of the committee members, the various departments were requested to prepare reports listing the current status of their programs and their future plans. Based on these reports, the departments were also encouraged to undertake their own SWOT analysis and discuss the issues that they faced, their plans for future course offerings, and their vision for the future of their respective departments. The committee also listened to presentations of the various departments and used the opportunity to clarify and understand the various issues facing the departments.

d The committee also met with a select group of PhD students and alumni in order to understand the perspectives from these two important stakeholders of the University.

e Post the interactions with the faculty colleagues and the various departments, the committee sat together to identify the common themes that had emerged out of these extensive deliberations and interactions with the various stakeholders of CUSAT.

f These themes which emerged were then mapped to the terms of reference for the committee to discern if they fall within the ambit of the committee's review mandate. Post that exercise, we then proceeded to provide our recommendations which are elaborated further in the subsequent sections of the report.

g The committee continued with its deliberations online (Annexure 1) for the purposes of refining their initial observations and for the purposes of writing up this report.

h The committee did an extensive review of policy documents including NEP 2020, Shyam B Menon report to identify the emerging policy directions.[4]

Based on these deliberations, the committee identified the following ten themes for further discussion and recommendations.

1. Initiating new academic programs and inter-disciplinary centres
2. Improving the Quality of Governance
3. Optimizing resource utilization.
4. Enhancing the Quality of Teaching
5. Enhancing the Quality of Research
6. Improving Faculty Performance Management
7. Improving academic and research infrastructure
8. Enhancing Academia-Industry Collaboration and translational research.
9. Enhancing Internationalization
10. Augmenting Revenue Streams

We elaborate on these, in the subsequent sections of the report.

Chapter 3

IDENTIFIED CHALLENGES AND RECOMMENDATIONS

3.1 Initiating New Academic Programmes and Interdisciplinary Centres

CUSAT is currently offering 94 academic programmes with more than 8,800 students and 400 teachers. In tune with the best practices followed by reputed Universities abroad and the vision of NEP, the University should target a student population of 15,000 in the next 5 years with teacher strength of 1,000. This can be achieved through a combination of offline programmes, online programmes, hybrid programmes, International dual masters programmes, industry linked programmes and executive education. The existing academic programmes need to update regularly. The departments should be encouraged to redesign of the existing academic programmes and launch programmes regularly to make them relevant.

CUSAT should create pathways for students to translate insights from fundamental research into practical products through strategic collaborations with industry partners. These alliances will cultivate a supportive environment where students can convert their theoretical knowledge into real-world solutions, thereby enhancing innovation and developing practical problem-solving skills. Additionally, these initiatives will empower students to embark on entrepreneurial journeys by providing mentorship, resources, and guidance to help them transform their concepts into successful businesses. This strategy not only enhances their career opportunities but also contributes to job creation and economic development, positioning CUSAT as a key player in driving technological and industrial progress.

3.1.1 Proposed Interdisciplinary Centres at CUSAT

The objective of Interdisciplinary Centres at CUSAT is to foster collaboration among diverse academic disciplines, promoting innovative research and solutions to complex global challenges. By bringing together faculty members and students from various fields, these centres can create an environment that encourages the exchange of

ideas and the development of cross-disciplinary skills. They also enhance the mission of CUSAT in advancing knowledge and addressing societal issues, ultimately contributing to a more integrated and holistic educational and research experience. The future of science is increasingly intertwined with interdisciplinary research, as complex global challenges demand collaborative solutions that draw on diverse fields of knowledge.

3.1.1.1 Centre for Geography, Ecology, Environment, and Bioresources

CUSAT is ideally situated to conduct multidisciplinary research on the Western Ghats. The centre will contribute to conservation efforts, inform policy decisions, and promote the sustainable use of the region's natural resources. This initiative will enhance CUSAT's role in addressing critical environmental challenges and position it as a leader in ecological and environmental research.

3.1.1.2 Centre for Neuroscience, Cognitive Psychology, and Computer Science

The integrated school on neuroscience, cognitive psychology, and computer science will conduct research on information processing in the human brain and develop computational models to mimic cognitive functions. The focus will be on deepening our understanding of neurological disorders and laying the foundation for creating highly sophisticated intelligent systems.

3.1.1.3 Centre for Scientific Management

Traditionally, science education in our country has focused on the technical aspects of scientific disciplines, often neglecting the development of economic and management skills. Insights from management sciences can provide valuable guidance for implementing scientific innovations effectively. Introducing economic concepts can enhance the translation of scientific knowledge into viable entrepreneurial endeavours through various stages of incubation and startup. Innovative undergraduate and graduate-level courses that integrate these elements are envisioned to nurture the next generation of entrepreneurs and industry leaders.

3.1.1.4 Centre for Energy Research

Electric vehicles are transforming the automotive industry by offering a sustainable alternative to traditional gasoline-powered cars, significantly reducing greenhouse gas emissions. Battery research is at the forefront of this revolution, focusing on enhancing energy storage capabilities and CUSAT should take a lead in advancements in battery technology research with faculty members from engineering and basic science.

3.1.1.5 Centre for Semiconductor Science

The India Semiconductor Mission (ISM), under the Ministry of Electronics and Information Technology[6], aims to build a strong semiconductor and display ecosystem in the country, with the vision of making India a global hub for electronics manufacturing and design[7]. To advance this national mission, a dedicated center may be established, bringing together interested faculty members from departments such as physics, chemistry, optics, and electronics, in collaboration with engineering departments.

3.1.1.6 Centre for Quantum Technologies

The Union Cabinet of India approved the National Quantum Mission (NQM)[8] in April 2023, focusing on Quantum Computing, Quantum Communication, Quantum Sensing & Metrology, and Quantum Materials & Devices. The Department of Science and Technology (DST) is coordinating this mission. The University should establish a centre involving faculty from the departments of physics, optics, and electronics, in collaboration with engineering departments, and launch a program on quantum computing.

3.1.1.7 Centre for Sustainability Research

This department can have an integrative perspective with several departments such as environmental studies, biotechnology, chemistry, and engineering working together to address the important sustainability issues that cut across multiple domains.

3.1.2 Proposed New Programmes

In addition to on-going programs, new initiatives will leverage the unique skills and expertise of our faculty to align with national missions undertaken by the Government of India. This will involve establishing specialized centers dedicated to advancing research in quantum technologies, artificial intelligence, bio manufacturing and other emerging fields of innovation.

For instance, the Department of Science and Technology (DST) is implementing the following National Missions[5]

1. National Mission on Interdisciplinary Cyber Physical Systems (NM-ICPS)
2. National Quantum Mission (NQM)
3. National Super Computing Mission (NSCM)
4. Climate Change Missions (CCM)

Academic programmes both at PG and PhD level could be offered aligning the programme objectives with the focus areas of National Missions.

In line with the new Educational Policies, more integrated PG programmes should be started in the University. Currently the integrated programmes are mainly confined to Faculty of Science. Similar programmes should be designed and offered in Social Sciences, Engineering, Technology and Marine Sciences. The University may also consider offering Integrated MS PhD programmes in select departments. ***New programmes may be offered in emerging areas such as***

- Synthetic Biology
- Structural Biology
- Bio Engineering
- Chemical and Bio Engineering
- Pharmaceutical and Food Engineering (B.Tech)
- Cell and Molecular Biology
- Genetics/Genomics
- Cancer Biology
- Bio Informatics
- Quantum Technologies
- Sensor Technology/ Bio Sensors

- Material Science
- Energy materials and energy storage
- Materials for AI
- Complex Systems
- Water Technology/ Sustainable Technology
- Energy Studies
- Coastal and Marine Technology
- Seafood Technology
- Medical Devices
- Medical and Health Technology
- Optical Engineering/ Computing
- Semiconductor Engineering
- Cyber security
- Climate Science
- Renewable Energy
- Data Science and Analytics
- Artificial intelligence and Machine Learning
- Robotics and Automation

In addition, Volume 2 of this report shows the list of new academic programmes/ certification / online courses proposed by the departments/centers to the expert committee during their interactions with the departments/centers.

3.2 Improving the Quality of Governance

3.2.1 Advocating the creation of clusters

Drawing on the New Education Policy (2020) and the Commission for Higher Education Reforms (2022) which advocated the creation of multidisciplinary educational institutions and the creation of clusters *'with similar or contiguous domains of teaching and research*[9], we attempt the same philosophy in recommending clusters across the following departments.

The formation of these clusters is based on the rationale that the need of the hour is to foster greater collaboration between various departments across the University and to provide a facilitating environment for departments to move out of their individual siloed environments. In addition, during our interactions with the faculty across various

departments and while listening to the various presentations of the departments, we observed substantive levels of duplication in several course offerings resulting in sub-optimal utilization of faculty and University infrastructure resources. We therefore feel that there is a strong rationale for the creation of a system of *'course clusters and cross- listing of courses*'[10] to enable optimal utilization of resources.

In order to operationally facilitate the working of these clusters, we suggest the creation of a 'Faculty' under which associated Departments, Schools and Centres will be housed. As a consequence, we suggest a substantial strengthening of the existing office of the Dean. We envisage that the concerned 'Faculty' will be the nodal entity who would facilitate a greater thrust for a multi-disciplinary approach towards research and teaching within a 'Faculty' and across multiple 'Faculties'. In order to facilitate cooperation across the clusters/faculties, we suggest that there be a Dean's Council which will be headed by the Vice-Chancellor with Pro-Vice Chancellor being the convenor of this body. The Dean's Council will be the coordinating vehicle across faculties to ensure coordinated and focused actions across the University.

In addition, the Deans are also expected to work closely with the Board of Studies of the respective departments and the respective heads of the various departments. Aspects of such a governing structure have also been indicated in the report for the Commission for Higher Education Reforms (2022).[11] In the words of the commission's report, "such a composite Board of Studies (BoS) is envisaged considering the seamless continuity and coherence that we shall be proposing for the different levels of study from the undergraduate to the Ph.D. stage.[12]While the above mentioned report also proposes a University wide Board of studies to facilitate better coordination, we envisage this role to be devolved to the Dean's Council.

Our general philosophy and thought process which guides the recommendations is that (1) Degree granting courses are best housed in departments or schools which are linked to concerned faculty disciplines (2) Centres are best positioned for conducting research, consulting and for facilitating policy initiatives and will therefore not offer any undergraduate courses (3) The need to exploit scale related advantages and align with the NEP (2020)/ Commission for Higher Education Reforms (2022) perspectives on 4 year undergraduate programs.

Table 1 below lists the proposed Eight 'Faculties' and depicts the suggested grouping of departments / schools / centres under the various 'Faculty' Deans.

Table 1: Proposed Faculties

Name of Faculty	**Names of Departments/Schools/Centres.**
FACULTY OF ENGINEERING	School of Engineering
	Cochin University College of Engineering, Kuttanad
	Kunjali Marakkar School of Marine Engineering
FACULTY OF TECHNOLOGY	Department of Computer Applications
	Department of Computer Science
	Department of Electronics
	Department of Instrumentation
	Department of Polymer Science and Rubber Technology
	Department of Ship Technology
FACULTY OF SCIENCE	Department of Applied Chemistry
	Department of Mathematics
	Department of Physics
	Department of Statistics
	Centre for Integrated Studies
FACULTY OF APPLIED SCIENCE	School of Environmental Studies
	Department of Biotechnology
	International School of Photonics
	Department of Atmospheric Sciences
	Department of Forensic Sciences
FACULTY OF SOCIAL SCIENCES & HUMANITIES	Department of Applied Economics
	School of Management Studies
	DDU Kaushal Kendra (DDUKK)
	Department of English and Foreign Languages
	Department of Hindi
	Centre for Budget Studies
FACULTY OF MARINE SCIENCES	Department of Chemical Oceanography
	Department of Physical Oceanography
	Department of Marine Biology, Microbiology and Biochemistry
	Department of Marine Geology and Geophysics
	School of Industrial Fisheries
	National Centre for Aquatic Animal Health
FACULTY OF LAW	School of Legal Studies
	Inter University Centre for IPR Studies
	Prof. N. R. Madhva Menon Interdisciplinary Centre for Research Ethics and Protocols (ICREP)
FACULTY OF MEDICINE	Departments and Programmes to be established

The committee recommends that the Faculty of Engineering and the Faculty Technology can be merged together in the long run. Similarly, Science and Applied Science can also be combined. Similarly, every centre of CUSAT should be brought under a Dean for effective coordination.

Apart from the 'Faculty' Deans, we recommend the creation of five additional Deanships, i.e., Dean -Research and Development, Dean -Infrastructure Development, Dean- Student Affairs & Outreach and Dean-International Affairs. Currently, there is an existing Director (Alumni Affairs and Corporate Development). We therefore are proposing an upgradation of this position to a Dean (Alumni Affairs and Corporate Relations) given the importance associated with engaging with the alumni and with the corporate sector .

The University governance structure therefore comprises the following principal officers, namely, the Vice Chancellor, Pro-Vice Chancellor, Deans, Directors and Department Heads. The activities of these officers/positions are monitored by various bodies at various levels, *i.e.,* Senate, Syndicate, Academic Council, Deans' Council and the Board of Studies. While these positions/bodies already exist in the current University governance architecture, our recommendations place considerably greater emphasis on the role of the Deans as important linchpins in facilitating governance across multiple levels across the University hierarchy in order to provide the desired thrust for effective implementation of the recommendations indicted in this report. Figure 1 below depicts the relationship among various entities in the proposed structure.

.In creating this organizational structure, we drew on insights from the structure depicted in Figure 9, Page 98 of the Commission for Higher Education Reforms (2022).[13]

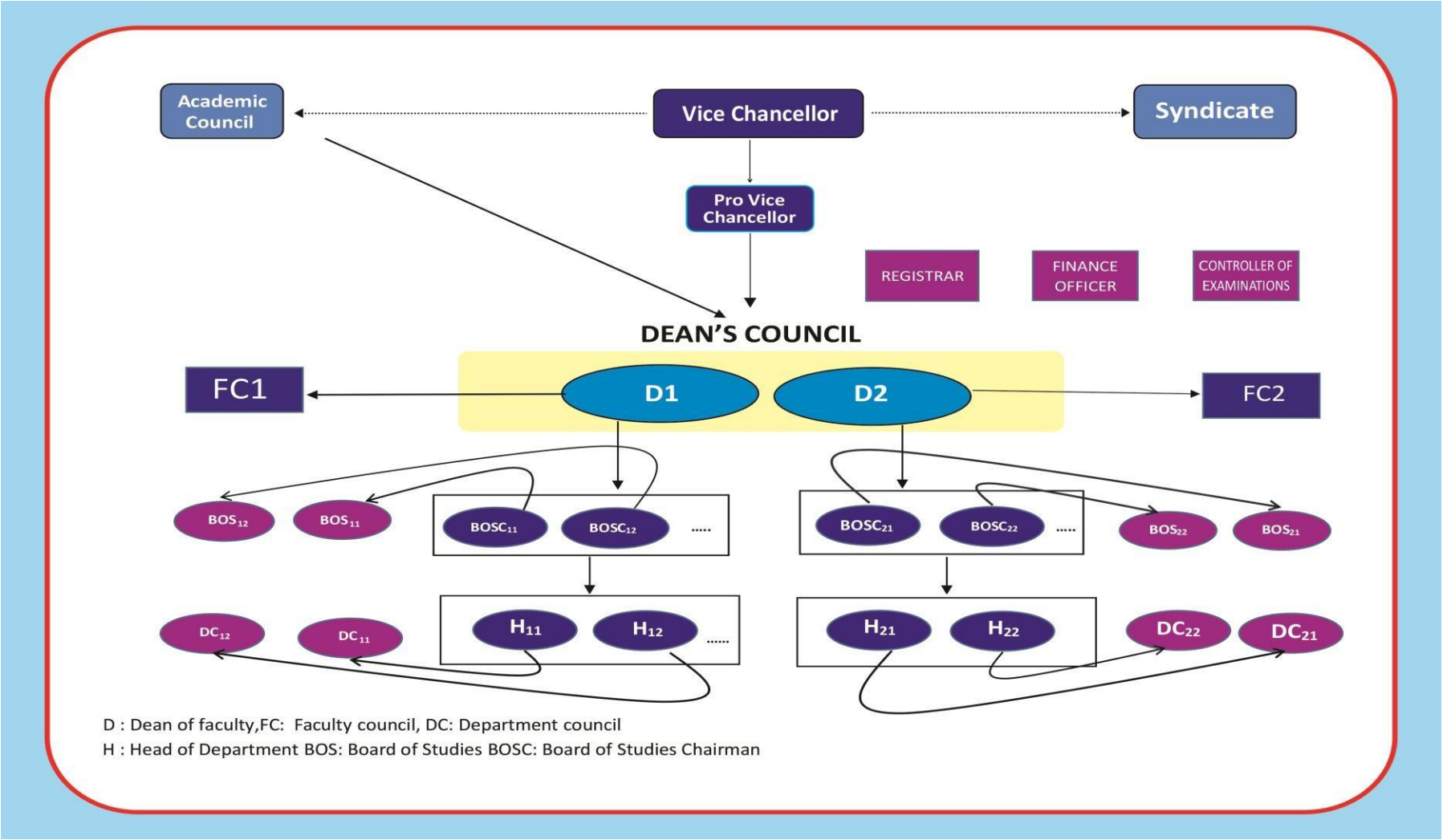
Academic Council
Vice Chancellor
Syndicate
Pro Vice Chancellor
REGISTRAR
FINANCE OFFICER
CONTROLLER OF EXAMINATIONS
DEAN'S COUNCIL
FC1
D1
D2
FC2
BOS12
BOS11
BOSC11
BOSC12
.....
BOSC21
BOSC22
.....
BOS22
BOS21
DC12
DC11
H11
H12
.....
H21
H22
DC22
DC21
D : Dean of faculty,FC: Faculty council, DC: Department council
H : Head of Department BOS: Board of Studies BOSC: Board of Studies Chairman

Figure-1

3.2.2 Roles and Responsibilities of the Deans and Heads of Departments/Schools/Centres

3.2.2.1 Academic Deans *[of the Eight Faculties indicated in Table 1]*.

Academic Deans should be the custodian of academic quality in the University. Their specific tasks include

i. Dean will be heading the faculty council approving modification to existing programmes and proposals for new programmes originating from various BoS under the faculty, department or school. The academic committee should be constituted at faculty level under the Faculty dean.
ii. Dean will represent the faculty in bodies like the Academic Council.
iii. The Faculty Dean has to execute the policy of the University in the conduct of Ph.D. and other research programmes including the examination of the thesis.
iv. The Faculty Dean should periodically review the performance of the faculty in coordination with the Department Heads in a faculty. The outcome of the review should result in recognizing high performing faculty based on transparent and well-regarded metrics. The institution of teaching and research awards to recognize outstanding performance by faculty is highly encouraged.
v. Formulate policies for the conduct of research and steps to maintain suitable standards by implementing policies of the University.
vi. Helping with finalising of academic calendar and timetables in coordination with the Deans of other faculties.
vii. Finalising specific activities of the respective schools/ departments in consultation with the Head of Departments and should be included in the master calendar. This should be done with the objective of avoiding overlapping and for the optimum use of resources and facilities.
viii. The Faculty Dean should try to avoid overlapping courses across departments under the faculty. Courses having high common contents should be structured to have a common syllabus which can be offered by one teacher under the faculty. Students from departments under the faculty should attend the common class.
ix. The Faculty Dean should ensure that every Faculty member teaching course

during the semester prepares a course plan as per the prescribed format and is circulated among students within one week of the commencement of the programme.

x. The Faculty Dean should coordinate a bi monthly meeting of the Heads of Departments/Schools, including Faculties and minutes of the meeting should be submitted to the Vice Chancellor. The Dean should ensure smooth conduct and progress of the classes as planned in the calendar. It will also help in smooth conduct of the classes, registration of students for courses, allocation of classrooms, and proper conduct of the examinations.

Given the range of responsibilities the Dean *[of a faculty]* has to perform, we strongly recommend the creation of an office for the respective faculty deans and assigning at least one staff member to the concerned faculty dean to assist with the various activities.

3.2.2.2 Roles of the Deans Council

The composition of the Dean's council will constitute the Eight Faculty Deans, Five additional Deans (other than the Deans associated with a concerned faculty), the Pro-Vice Chancellor and the Vice Chancellor. Their roles and responsibilities would be to work with the Pro-Vice Chancellor and the Vice Chancellor to ensure compliance with various UGC and government guidelines and their periodic updating. We suggest that the Dean's council meet at least once a month to deliberate and process these requests in a timely manner, thereby aiding the Vice Chancellor in the functioning of the University. The Dean's council in coordination with the Faculty and Department Councils may also examine the possibility of assigning teaching credits based on enrolment numbers in course and also encouraging teaching across departments in faculty to begin with, and subsequently across the University. Some of the responsibilities are indicated below.

i Establishing and determining the equivalence of courses from other Universities nationally and internationally and school heads and other special requests of such nature.

ii Considering and deciding on extension of PhD registration, condonation, requests for faculty fellowships which have been routed through the various faculties and department and centres.

iii The Deans Council will decide all policy issues related to IT and library resources of the University. Library staff will report to one of the Deans designated by the Vice Chancellor.

iv The Deans Council should review performance of all the Departments/Schools once in 3 years.

v One of the Dean's Council members should be nominated as Director, IQAC.

vi The Deans Council should appoint a faculty mentoring committee. This is not an evaluating committee but a venue for the faculties to seek advice without the concern of being judged.

vii The Deans Council should scrutinise the applications from the faculty members for various programmes funded by the University including foreign teaching/training, short term courses, seed money. Every faculty undertaking foreign visit should prepare a tour plan and submit it to the corresponding Dean.

viii The Deans Council under the Vice Chancellor should handle issues related to faculty discipline, integrity and commitment. Deans should assist the Vice Chancellor in maintaining the discipline and work ethos among the various schools and between the faculty members. They have the responsibility in maintaining the high academic standards and achieving academic excellence in the institution.

ix Co-ordinate the conduct of Convocation.

3.2.2.3 Dean [Student Affairs and Outreach]

i. All the hostel wardens and supporting staff will report to the Dean (Student Affairs and Outreach).

ii. All the Co-curricular and Extra-curricular activities of the University– NCC, NSS, Cultural, Sports and Recreation, Students' Magazines and Newsletters, Scientific Festivals & Quizzes will be under Dean (Student Affairs and Outreach). The coordinators of these activities will report to the Dean (Student Affairs and Outreach).

iii. Dean (Student Affairs and Outreach) will be responsible for students facilities and welfare matters including:

- Hostel facility and allotment.

- New student's orientation and facilitation
- Assigning the Faculty advisors to students.
- Career counselling and Stress related counselling
- Matters related to the Students Council.
- Student disciplinary matters – academic as well as non-academic conduct including anti-social and deviant behaviour/conduct/activity (ragging, harassment and discrimination etc.) related matters.
- Correspondence/Interaction with parents/Guardians of students about their progress and individual problems/welfare.
- Extension and Outreach activities including Organizing and participation in Conferences / Festivals/Fairs.

3.2.2.4 Dean *[Infrastructure Development]*

i. Planning the expansion and diversification of institute's activities and preparation of all developmental proposals, formulation of plan and estimates related to research infrastructure and instrumentation and campus and building facilities.

ii. Monitoring the physical targets and utilization of funds in respect of above projects/ schemes and in the preparation of relevant papers for submission of progress report.

iii. Formulating proposals for new buildings/centres/facilities/initiatives for research and academic and organizing meetings of faculty members and external experts for such purposes.

iv. Information and data maintenance regarding the above expansion and diversification plans and projects, required for compilation of various reports periodically required for furnishing to the Ministry of Education and other agencies/organisations.

v. Providing necessary inputs and data for the budgeting and new estimates & plans.

vi. Engineering staff will report to the Dean (Infrastructure Development).

3.2.2.5 Dean *[Research and Development and Consultancy]*

i. All extramural funds received by the University will be handled by the Dean (Research and Development and Consultancy).
ii. Dean (Research and Development and Consultancy) will be the designated signatory for all projects/research proposals/consultancy works submitted by faculty members through various agencies for extramural funds.
iii. Modalities and Intellectual Property matters related to industrial (public sector and private sector) sponsored research and consultancy.
iv. Staffing and appointments under research projects.
v. Fund utilisation and sharing of funds and resources amongst research projects and institute's funds.
vi. Database regarding faculty expertise.
vii. Dean (Research and Development and Consultancy) should interface between the University and Industry for all collaborative industrial projects and assignments.

3.2.2.6 Dean *[International Affairs]*

The Dean (International Affairs) will have the mandate to promote internationalization, enhance the institution's global presence, and facilitate meaningful interactions between our institution and the global community. The activities include:

i. International Collaboration: Identify, establish, and nurture partnerships with Universities, research institutions, and organizations globally to promote academic cooperation and exchange.
ii. Exchange Programs: Develop and oversee student and faculty exchange programs, ensuring seamless integration and valuable cross-cultural experiences.
iii. Global Education: Organize workshops, seminars, and cultural events to enhance students' global awareness, cultural understanding, and appreciation of diverse perspectives.

iv. International Research: Facilitate joint research projects, conferences, and collaborative initiatives that promote international research collaboration.
v. Diversity and Inclusion: Promote diversity and inclusion within the institution and create an environment where international students and faculty feel valued and supported.
vi. Global Reputation Enhancement: Contribute to enhancing the institution's global reputation through strategic international engagements and collaborations.
vii. Cultural Diplomacy: Act as a cultural ambassador, representing the institution at international events, conferences, and forums.
viii. Networking: Build and maintain a strong network of international partners, alumni, and stakeholders to foster collaboration and knowledge exchange.
ix. Providing opportunities: The Dean can offer opportunities for students to learn about global technology and compare their professional experiences with others in different countries.

3.2.2.7 Dean *[Alumni Affairs & Corporate Relations]*

The Dean (Alumni Affairs and Corporate Relations) is proposed to develop a linkage between the University and its Alumni and the corporate sector. The alumni are one of the crucial pillars of the University, who are its ambassadors to the corporate sector and society. The Dean (Alumni Affairs and Corporate Relations) will lead the efforts of the University to involve its alumni in various activities, including:

i. Seeking academic support from the alumni and the corporate sector through activities such as visiting/adjunct faculty, student mentorship, research collaboration, and facilitating industry/ academic tie-ups.

ii. Creating a network between the University, its alumni and the corporate sector, for providing a platform for interaction among alumni groups and between alumni, the corporate sector and students.

iii. Creating a comprehensive database of the alumni and organizing alumni congregations on campus.

iv. Collaborate with alumni and the corporate sector for contributions such as donations, scholarships that benefit future students.

3.2.2.7 Faculty Council

The faculty council will be the body which will facilitate coordination of various research and academic activities across the various departments in faculty. Its composition will include the Dean (of the faculty) and the respective department heads of the various departments. It will also serve as a link between the Department councils and the Dean's council. The faculty council will facilitate the introduction of new courses, help with interdepartmental teaching coordination, and stimulate research initiatives across departments in a faculty. In addition, the faculty council will help in evaluating project proposal submissions, the review of programs across departments among other activities. In evaluating new programs, preference may be given to programs that are linked to national missions at the center and state and also those programs that have the potential for significant market-based demand or that which addresses a critical unmet need of the country or region.

3.2.2.8 Department Council

This is an existing body and its composition, and functions remain the same as currently exercised.

3.3 Optimizing Resource Utilization

CUSAT has more than 400 faculty members spread across 33 departments under 9 faculties. It also boasts of state-of-the-art facilities and equipment in departments as well as specialized centres. To ensure most efficient utilization of these resources the following measures are proposed. Flexibility should be the hall mark of the governance structure.

3.3.1 Avoiding duplication of courses

We find that there is a substantive issue of course duplication in the University. Courses in computer science, science, economics, law etc are examples. Similar courses (content similarity more than 75%) shouldn't be offered by different departments. As the first step, a policy to be made that similar courses will be avoided within the same faculty. This has to be ensured by the respective Faculty Dean while approving the department wise timetable. One department under the faculty should be entrusted with running of the course and students from other departments under the faculty should be permitted to

enroll for the course. Later this can be extended to all courses in the University across all faculty.

3.3.2 Avoiding duplication of programmes and Departments

We find that several programmes across departments have a similar focus and high content overlap. For instance, programmes related to Computer science and Marine science and Engineering programmes are split across Faculty of Technology and Faculty of Engineering. The splitting of resources into many departments and programmes weaken the resource utilization. The committee recommends that a syndicate committee be appointed to look into this matter of combining departments and merging programmes to make them more viable and stronger.

The committee recommends that no centre should be offering academic programmes other than Ph.D. If a centre wants to offer PG / UG programmes, it should either be attached to a department or should be elevated as an independent department. For example, the centre for budget studies may be attached to Department of Economics and DDUKK may be elevated as a department. A domain expert committee may look into each centre and take appropriate decisions.

We also recommend that the minimum number of seats in a programme should be 30 at PG level and 50 at UG level.

We find huge duplication of equipment within the department, leave alone the University. The practice of project-based laboratories should be abandoned. Departments should thematically group equipment to create labs. A centralized inventory of facilities and equipment will be prepared and maintained with regular updates in the University. The purchase committee of the University should ensure minimum duplication when purchase requests for new equipment are received. An effective mechanism for permitting teachers, scholars and students from other departments into any lab inside the University should be mandatorily regulated through a common policy.

Efforts should also be made to modify the existing statutes and laws for faster implementation and better transaction efficiency. Purchase procedures should be modified for enhancing the permissible limits to give more freedom to departments and Project Investigators for purchase of equipment and materials.

3.4 Enhancing the Quality of Teaching

Traditionally, Indian Universities have adhered to a teacher-centric approach, where instructors lead the class and students passively absorb information. Unfortunately, this limits the role of students in the learning process. In today's digital age, where a substantial amount of teaching material—including high-quality videos and interactive animations—is readily available, it is essential to redefine the teaching and learning process.

One innovative approach to this transformation is the flipped classroom model. In this method, students engage with new information before class, allowing class time to be used for activities that promote higher-order thinking, problem-solving skills, and creativity. Flipped classrooms offer several advantages. Students take greater responsibility for their own learning, rather than encountering new material from the teacher for the first time during class. Additionally, class time spent for delivering information is minimized, as students access content beforehand from various sources.

The committee proposes adopting a hybrid approach to teaching and learning in CUSAT. This combines conventional teaching practices, allowing a 75% contribution with the principles of the flipped classroom having 25% contribution. In this hybrid model, educators can continue to provide foundational knowledge through direct instruction while incorporating flipped classroom techniques to encourage student engagement and responsibility. Instructors can involve PhD students and post-doctoral fellows in the flipped classroom activities. By blending these approaches, we can create a dynamic teaching and learning environment for undergraduate students that not only prepares students for academic success but also equips them with the critical thinking, creativity and problem-solving skills necessary for the challenges of the future.

3.5 Enhancing the Quality of Research

On enhancing research quality, the thrust of our report is twofold. Firstly, there is a need for enhancing the promotion and incentivization of research across Faculties/Departments/Centres in the University. These should be enhanced through a greater focus on international and national collaborations, student and faculty exchanges with institutions of global repute. In our governance recommendations, we have specially instituted suggestions for enhancing inter-faculty, inter-departmental and cross-centre collaboration to provide the mechanisms for enhancing greater research

and multidisciplinary collaboration across the University. These intra-University collaborations should also help in facilitating greater collaborations with national and international institutes of repute given the increasing importance of multidisciplinary work globally. In recognition of the utmost importance of this activity, we have proposed the creation of a Dean (Research and Development and Consultancy) position in order to provide a further thrust and importance to accelerate this requirement.

Secondly, in the spirit of the NEP (2020) and Commission for Higher Education Reforms (2022)report recommendations, we suggest a focus on integrated bachelors and master's courses in the University (through rationalization of existing courses/programs where appropriate, and the creation of new cutting-edge programmes where desired) across the University's various programs in order to pursue the twin objectives of harnessing scale associated with the Universities activities and also to capitalize on the University's research excellence. The annexure to this report provides some indicative suggestions along these lines with regard to select faculties/departments/centres.

Cochin University of Science and Technology (CUSAT), being the only Science and Technology University in the state of Kerala, has to take the lead role in pioneering state of the art research in Science and Technology. CUSAT has to remain a top ranked research University in India providing pioneering research across. Engineering, Environmental Studies, Humanities, Law, Marine Sciences, Science, Social Sciences and Technology. With 31 teaching departments, 26 centres of excellence, more 400 faculty and more than 1200 PhD students, the University should undertake interdisciplinary academic and research programs in the state of Kerala. CUSAT should improve research collaboration with well-established premier research institutions in the country as well as Universities abroad. Efforts should be on to win funded projects and grants from agencies such as DST, DRDO, DBT, ICMR, MoES, KSCSTE etc

Some specific initiatives and suggestions to operationalize the enhancement of research capabilities and outcomes and to optimize the scale of operations associated with the University's activities include:

(a) Assessments by the Vice Chancellor of all faculties/departments/centres to assess the academic/research work done by the Department at the end of each semester.

(b) Allocating a greater number of Post-Doctoral Fellowships to the Departments so that experienced scholars can be inducted to the University, thereby improving the research productivity.

(c) Evaluating outcomes of all the active MoUs between CUSAT and other educational/research institutions and taking stringent measures to improve the outcomes of such collaborations in the form of quality research papers.

(d) Providing financial support to the PG/Research students to present their research papers in reputed international conferences. More funds may be earmarked for each academic year.

(e) Increasing the Seed Money grant amount so that the Faculty Members can establish their research lab with all the required infrastructure facilities thereby improving the research productivity.

(f) Computing the cumulative JCR impact factor of each faculty member at the end of each academic year and give performance wise incentives as support of additional research funds, student fellowship, travel funds etc

(g) Motivating the final year PG students to undertake research-oriented projects and publish papers in reputed international journals.

(h) A faculty mentoring programme should be instituted for newly appointed faculty members to expose them to the need for quality publications to improve the national and global rankings of the University.

(i) Instituting Research awards for Faculty and students.

(j) Give commendation letters for excellence in teaching by the Vice Chancellor based student feedback on teaching

(k) Instituting a system for performance appraisal and evaluation, which includes review of annual performance of the faculty by the Vice Chancellor and Deans. Integrating student feedback (through ERP) and incorporating student feedback in faculty performance appraisal.

(l) Instituting Professor of Practice positions to facilitate the exchange of knowledge and practices between Academia and Industry. Use of industry internships for students and sabbatical with industry for faculty.

(m) Fostering greater engagement with Alumni for mentoring of industry projects among others.

(n) Periodic updating of syllabi so that it reflects the advances taking place in academia and industry pertaining to the various subjects.

(o) Launching executive education programs after assessing the potential demand for these courses.

(p) Using MOOCs to enhance the reach and optimize the utilization of resources to the extent feasible in various programs.

(q) Efforts must be made to obtain suitable international accreditations in order to enhance global visibility and acceptance of the degree awarded by the University in the global marketplace.

(r) Efforts should also be made to attract students from all over the country by making use of standardized national tests with the aim of having fifty percent of the enrollment from states outside of Kerala.

(s) Efforts should be made to reach out to students from neighbouring countries and the African continent to internationalize the student base to the extent feasible.

(t) There should be an attempt to have a more institutionalized placement mechanism in place to attract students to various courses. The associated cell responsible for placements should closely work with the Dean (Student Affairs and Outreach).

(u) Improving the existing infrastructural and analytical facilities and adding new equipment in central facilities allowing faculty to take up cutting-edge and advanced research.

(v) Creating a forum for interaction with appropriate stakeholders so as to catalogue need based research problems and making them available to faculty for developing solutions.

(w) Creating a quantifiable matrix for faculty appraisal which is transparent and encompassing the multiple possible areas of performance.

3.6 Introducing Faculty Performance Management

The faculty members are the most important entity on whom the future of the University rests. Hence sufficient measures should be implemented for the measurement and recognition of faculty performance.

Every faculty should be assessed based on his/her contribution to three parameters that constitute the fulcrum of faculty performance in the University:

1. Research, Projects and Consultancy

- Publications & Patents
- Projects awarded
- Consulting income generated
- Training (MDP & FDP) Income generated
- Seminar and conferences organised

2. Teaching Learning Facilitation

- Number of Courses taught
- Number of students enrolled
- New courses designed
- MOOC courses offered
- Student feedback received
- Innovations in teaching

3. Contribution to University Administration

- Academic Administration at the University level and Department level
- Presence in academic bodies and statutory committees.

4. Social responsibility

- Quantifiable Social impact of R&D work.
- Research/Product reaching target people.
- Contribution to the mission programs of the Government of India and of Kerala
- Social Services offered if any

5. Awards /Recognitions from reputed agencies based on their contributions.

An Annual Performance Report should be mandatory collected from each faculty member. A format presented by IQAC is shown in *Volume 2* of the report

The University should have norms for assessing performance against minimum performance under each parameter. The university has a well-defined Career Advancement Scheme (CAS) format, which meticulously assesses performance under Research, Projects and Consultancy parameters. Similar norms should be developed for assessing performance under the parameters of Teaching Learning Facilitation and Administration. Currently, the teaching workload has no relation to the number of students enrolled for the course. Also, the credit of the course and the teaching hours per week are also not standardised. We suggest that:

- Minimum number of students in a course should be 10.
- No course should be offered twice during a programme.
- No course to be duplicated across departments under a faculty.
- Teaching across departments to be permitted and accepted for work load.
- Appropriate relaxation in teaching workload for teachers engaged in defined administrative roles.
- If extra remuneration is received for teaching a course (executive programmes, MOOC etc), it should not be counted as part of the workload.

The Deans Council may prepare an appropriate method of calculating workload for faculty considering these factors.

3.7 Improving academic and research infrastructure

Improving the quality of academic and research infrastructure is an important agenda for any HEI. Efforts should be made to develop CUSAT as a ‘Smart Campus’. The student diversity within the campus has to improve. Support facilities and career opportunities for students should be enhanced. The following observations and suggestions are made in this regard.

- The current divide is no longer just between the rich and the poor; it now lies between students with access to the internet and those without. This digital divide has become a major factor in shaping educational equity, as students without reliable internet access face a significant disadvantage. Students should have unrestricted access to online resources and labs/laboratories on a 24/7 basis. Open space for effective faculty and student interactions needs to be provided.

- The existing classrooms need face lift. Also look at the possibility of increasing the classroom usage by staggered timing.

- Digital Enablement of CUSAT through Academic ERP is a must. CUSAT needs a dedicated and qualified IT management cell to coordinate all ICT related work. The existing Centre for Information Research Management (CIRM) needs to be strengthened. The data collection mechanism for accreditation and planning purposes should be strengthened. Software support should be provided for data collection and management. Also attendance management, stakeholder feedback, Examination management, Out-come Based Education (OBE) etc. need to be supported through academic ERP. The ERP should have a University dashboard for easy access to opportunities, scholarships, programmes etc.

- Learning management system has to be made fully functional in CUSAT. A full-fledged Online Distance [learning (ODL)] centre has to be set up in the campus. The centre should offer MOOC courses and ODL programmes regularly.

- A translational research centre has to be set up in the campus. It can be done with support from the Government and other with infrastructural providers like IT parks.

- The campus should boast of more regional diversity with students from other states / countries. The quality and quantity of students is also a concern as many programmes fail to get all the seats filled or have very low demand ratio. The admission processes should be strengthened. The feasibility of joining with national test – JEE MAIN for engineering / integrated programmes, CUET for science programmes etc should be explored. Effective Publicity and social media visibility should be ensured. A rigorous drive for attracting PhD candidates with UGC JRF should be made.

- Placement support be provided for all students across departments. Currently, the percentage of students getting placed is low except for a few departments. If students are interested in going for higher studies, sufficient career support need to be ensured. All UG / PG students passing out from the University should have a confirmed career option – placement or higher studies – by the time they leave the campus. extended to all faculty.

- On campus accommodation for students and faculty to be increased. The provision to set up more hostels and staff quarters in a Public Private Partnership mode (PPP) to be explored modeling on national institutions such as IIT Madras and IIT Udaipur..

- CUSAT has more than 1260 PhD scholars enrolled currently out which more than 700 happen to be full time scholars. Their services should be utilized more effectively. We propose that Teaching Assistantship for a minimum of two semesters be made compulsory for all fulltime research scholars. These scholars should be attached to faculty members in the department and should be assisting the teachers in conducting examinations, tutorials, remedial classes, academic administration and documentation. It will help the scholars to gain hands on experience in teaching and related work and will also help the department in streamlining the academic work.

3.8 Enhancing Academia-Industry Collaboration

The Higher Education sector is undergoing drastic changes over the last one decade. Innovation has become the new buzzword in the field of higher education. There is an ever-increasing need for establishing avenues of engagement with industry, transfer knowledge and create value. Both industry and academia stand to benefit from such long-term cooperation. Companies will gain greater access to cutting-edge research and scientific talent. Universities will gain new directions and partners in research. It also provides valuable experience for students in working in real situations. India's first University-based research park, IIT Madras Research Park epitomises what can be achieved by a confluence of bringing industry and academia together[14]. The Applied Science Park for Innovation Research and Entrepreneurship (ASPIRE) of IIT Mumbai and the Research & Innovation Park of IIT Delhi are other examples where premier academic institutions, Industry and Government collaborate with an intent of developing new technology and advancing Knowledge.

We are happy to note that CUSAT has taken some significant steps towards setting up joint ventures with industry such as Synthite Ltd. and Geojit Ltd. CUSAT should become a base for technology businesses to set up their R & D centres and grow leveraging on the expertise of CUSAT [15] . Companies working in sectors like Bio Technology, Marine Science, Chemical, Shipping, Electronics and IT will be invited to set up R & D space in the University[16]. They will work closely with the research departments of CUSAT on areas of interest to the firms. The studies show that companies operating out of academic institutions report lower operating expenses, higher research output, more patents generation and shorter product development cycle. The advantages to the companies would be (a) Exclusive research space in a vibrant ecosystem (b) Access to state-of-the-art facilities in the CUSAT campus (c) Access to high quality human resources including faculty and students (d) Access to the research output by the doctoral scholars and initiate technology transfer and commercialization process.

3.8.1 Proposed Measures for enhancing Academia-Industry Collaboration

CUSAT should establish a Technology Transfer Office with the mandate of taking the technologies developed inside the University to the industry. It will be a major interface between research facilities of CUSAT and industries outside. It will coordinate the translational efforts of the University through technology transfer, startups facilitation and sponsored research. This centre will work closely with the researchers of the University in order to understand the novel aspects and potential applications of their research. This will help to understand the uses and applications of the invention, likely markets, and companies active in the field that might be interested in licensing. It will help in choosing the right partners and also in negotiating technology transfers/ license agreements.

Collaborating with industry on CSR projects will help all the stakeholders of the University. CUSAT and industry can jointly design and execute projects for serving the interests of the students and society at large. Both parties can work together to identify projects that are aligned towards the Sustainable Development Goals of the United Nations and would fit to Schedule VII of the Companies Act 2013 (Section 135) that prescribes activities that would fall in the ambit of CSR. The CII Foundation and CUSATECH FOUNDATION can work in unison for the smooth and efficient execution of the projects.

CUSAT has an active startup ecosystem in the campus. This momentum has to be continued and CUSAT should have an array of University-connected start-up companies. When normal TBIs focus more on providing physical space and business support to start-ups, CUSAT start up hub should focus more on research and mentoring support in addition to office space. The focus should be on start-ups setup in the areas of the expertise of CUSAT where traditional Incubators are at a disadvantage. The interdisciplinary research support available in CUSAT will be a USP compared to any other TBI in the state.

CUSAT has implemented the Faculty start up policy. But the number of faculty start-ups are very few in number. The faculty should be encouraged to convert their research into commercial products collaborating with industry. Improved patents, technology transfer and spin of start-ups will enhance industry focused research on the campus.

3.8.2 Proposed Measures for enhancing improve research collaboration with industry

(a) Companies may be permitted to sponsor their qualified employees for PhD programme in CUSAT subject to the academic norms of CUSAT.

(b) CUSAT should actively engage with companies in jointly bidding for research projects from funding agencies like DST, DRDO and MeitY. The project topic will be of mutual interest.

(c) Qualified personnel working in the R & D lab of the companies may be recognized as PhD Co Guides of the research centres of CUSAT. They can also be co-guides in PG programmes.

(d) CUSAT should try to provide scholarships to select PhD holders to execute Post Doctoral Work in industry. Companies can use their services in the R&D without any financial obligations.

(e) CUSAT Startups can be encouraged to work on problems identified the companies.

(f) Every student of CUSAT should take a compulsory course integrating economic concepts that facilitates the transformation of scientific knowledge into viable entrepreneurial ventures through various stages of incubation and startup development. CUSAT may enter into MOUs with companies to facilitate this

3.8.3 Proposed Measures for enhancing improved academic collaboration with industry to meet the updated requirements of industry for their workforce.

(a) CUSAT should offer new generation programmes designed and executed in collaboration with industry partners. The focus will be on (a) PG programmes in selected domains where the students work on real life projects with partnering companies (b) Industry linked doctoral research programmes resulting in joint publications and patents (c) Part time PG programmes for working executives (d) Executive Development Programmes and (e) short duration skilling and training programmes.

(b) CUSAT should include experts from industry in various bodies such as the Board of Studies, advisory boards and expert committees. Similarly the University should support companies by nominating academic experts to be included as experts in various committees and boards of companies.

(c) CUSAT should enter into tie ups with companies – MNCs to SMEs- to provide Doctoral, Postgraduate and Graduate students to work as interns in the companies.

(d) CUSAT may facilitate with reputed companies under which companies can sponsor eligible employees for academic programmes like MBA, MTech without going through the usual selection process.

(e) CUSAT should establish a Professor of Practice as proposed by UGC. Industry experts can also be employed as Adjunct Faculty in CUSAT. It is an honorary position offered to distinguished professionals who have excelled in their field of specialization.

(f) Leading companies may be invited to establish Faculty Chairs and R&D infrastructure in CUSAT. These facilities, set up in the domain of interest of the sponsoring company, will be named after the sponsor.

(g) CUSAT can offer Consulting and Training support to Industry in various domains. The faculty can undertake consulting assignments and offer customized MDP programmes.

3.8.4 Suggested Focus Areas of CUSAT- Industry collaboration

(a) Cognitive Computing: Research in the areas of Artificial Intelligence and Machine learning will be promoted. High performance computing for interdisciplinary applications such as medical imaging, data mining, etc. will come under this umbrella.

(b) Bio and Life Sciences: Sustaining human life through pharmaceutical research and drug development is an important area of work with industry. There are opportunities in biotech applications for better living and in improving processes for creating biotech products.

(c) Technology for mitigating climate change: Climate change has brought short term opportunities in monitoring and prediction of weather-related catastrophic events.

There are also several long-term opportunities such as creating more renewable energy-oriented products, electric vehicles, solar appliances, etc. which reduces the root cause of climate change.

(d) Agri-tech: A well-funded area of research in India which is truly interdisciplinary in nature. There are requirements in creating environment friendly fertilizers, bio-manure and sustainable use of land. There is also a need to bring in automation in irrigation, monitoring, etc. using internet of things.

(e) Design Technology: Factories and manufacturing hubs are being constructed to incur the lowest energy and maintenance cost. Better design technology development for electronic, mechanical, instrumentation and civil engineering streams will be a focus of collaboration with industry in the innovation campus.

(f) Fintech: Digital transformation has increased the dependence on technology in financial domain sub-areas such as banking, insurance, investment instruments etc. Startups in the Fintech space require expertise from CUSAT in Blockchain, Data analytics, etc., which is an area of collaboration.

(g) Medical Technology: Indian industry has made significant progress in local production of equipment used in diagnosis, surgery, imaging, etc. Focus will be given to the production and testing of medical instruments with assistance from various departments of CUSAT.

(h) Transportation and Mobility: As a pioneering institute in Ship Technology, Naval Architecture in the State, CUSAT continues to perform significant consulting in water transport. We intend to extend this expertise into research on mobility hub applications, where road, rail, water & air transporting technology will work together for providing seamless transportation to the public.

(i) Communication Systems: Transformation in telecom, wireless and digital media is revolutionary, and many industries are playing catch up. The applications dependent on the latest generation of communication systems is a challenge industry is trying to solve and these core engineering systems are being designed based on research in areas of signal processing, RF communication, Antennas, etc.

(j) Material Science: Chemical processing, clean room technology, semiconductor manufacturing, etc. are areas of material science, where there are high value applications in the electronics and computing industry. R&D in these technologies need an industry partner, who in turn needs trained personnel. An innovation campus can be ideal for this collaborative research.

(f) Other areas include Water Technology, Seafood Technology, Energy Studies, Pharmaceutical and food engineering. Artificial Intelligence, Semiconductor Engineering and Medical Technology also offer tremendous scope for collaboration.

3.9 Enhancing Internationalization

Internationalization is crucial for Indian Higher Education Institutions (HEI) as it is a crucial component in increasing the global competitiveness and reputation of the institution. Internationalization is a key factor in global University rankings, and Internationalized HEIs receive more international students and faculty. NEP (2020) has envisaged India as a global study destination. Internationalization encourages the development of globally relevant curricula and prepares students for a globalized workforce. International partnerships and collaborations with foreign institutions lead to enhanced research opportunities for our faculty and researchers. UGC has developed 'Guidelines for Internationalisation of Higher Education'. Highlighting activities such as internationally relevant curricula, brand building of Indian Higher Education Institutions abroad, academic and research collaboration with foreign Universities, credit recognition under twinning arrangements, global citizenship approach and engaging with foreign alumni.[17]

Internationalization can significantly enhance the reputation, academic quality, and global influence of Cochin University of Science and Technology (CUSAT). By fostering international collaborations, student and faculty exchanges, and research partnerships, CUSAT can position itself as a globally competitive institution.

The activities proposed include

3.9.1 Collaborative Academic Partnerships

Partnering with leading Universities across the globe CUSAT should offer double degrees or exchange programs. Dual degree programme shall be a programme jointly designed and offered by CUSAT and foreign Higher Educational Institutions in the same disciplines/subject Areas and in the same level. The degrees for such programme

shall be conferred by CUSAT and foreign higher educational institutions, separately and simultaneously, upon Completion of degree requirements of both the institutions. The students should preferably complete 50% of their studies in CUSAT and complete the remaining in the partnering institutions. If that is not possible, a twinning agreement with credit transfer can be worked out. CUSAT should target at least one international academic programme in every department within the next two years. Also a target to get at least 30% students experience international mobility should also be worked out.

3.9.2 Faculty Internationalization

The focus should be on developing a globally competent faculty body through international exposure and collaborations. It should be implemented through liberal Faculty exchange and sabbatical programs abroad, hiring international faculty members for teaching and research and permitting teachers to participate in international training programs and conferences. CUSAT should ensure that all permanent faculty members get international exposure over the next 5 years.

3.9.3 Research Collaboration

CUSAT has performed well to in connecting with International Agencies for soliciting research projects. But the number of internally funded projects and the value of these projects are much lower than many of the top ranked institutions. This being an important parameter in international ranking, the scale of the activities should increase. Joint research initiatives with global academic and industrial partners in emerging fields should also increase.

3.9.4 Attracting International students

The percentage of foreign students in the CUSAT campus is abysmally low. CUSAT can actively attract international students through targeted strategies. CUSAT can offer scholarships and incentives for international student, International admissions promotional campaigns, specialized programs designed for global learners etc. should be examined. . A target of 10% should be set for foreign students in the next 5 years. In this regard, tailor-made programs for students from Africa, the Middle East, and Southeast Asia could be helpful.

3.10 Augmenting the Revenue Streams

We find that internal revenue of CUSAT including fees, projects and consulting income is less than 20% of the total receipt. This overdependence on government grants and assistance may not augur well for the future of an autonomous state University like CUSAT. Efforts are to be made to increase the total budget for the University and also to increase the share of internal revenue. Some of the measures suggested are:

- All faculty members should be encouraged to apply for projects against calls made by various agencies at the central and state level. Create awareness among the faculty about the project call and circulate the Notification through the University website/Email. Keep the bureaucratic process simple. Incentivise teachers who get project funding.

- Invite industry to join CUSAT in jointly bidding for research projects from funding agencies like DST, DRDO and MeitY.

- CUSAT can facilitate companies with a research focus to set up a base in the campus to leverage on the expertise of CUSAT. Companies can utilize its state of the art laboratories, testing facilities and qualified manpower to execute their R&D projects.

- CUSAT can offer Consulting and Training support to Industry in various domains. The faculty can undertake consulting assignments and offer customized MDP programmes.

- CUSAT should permit the industry and outside agencies to use its facilities for a fee. It will augment the revenue as well as help companies to leverage on the expertise of the University.

- Leading companies may be invited to establish Faculty Chairs and R&D infrastructure in CUSAT. These facilities, set up in the domain of interest of the sponsoring company, will be named after the sponsor.

- CUSAT should actively seek CSR funds from industry to execute projects related to areas such as developing student amenities and facilities such as medical centre, hostels and smart classrooms, Scholarships for differently abled and disadvantaged category students, Entrepreneurship facilitation centre for women and SC/ST students and Mentorship and funding support for student startups working in domains of interest

- Alumni funding is vital for any HEI. The University should make efforts to tap Alumni funds for the development of the University including setting up new facilities and supporting students.

- MOOC and ODL programmes are becoming very popular. CUSAT can leverage on its brand value to launch unique and market driven MOOC and ODL programmes

- Execution Education should be given adequate attention. Online and Hybrid model MBA, M.Tech, LLM, MSc for example could be offered to working professionals.

- The reviewing of the academic programmes can increase the demand ratio. The fee levels should be revisited and should be rationalized. The number of seats should be enhanced so as to ensure the viability of the programme.

- The University should explore the option of Infrastructure development through mortgaged loans from financial institutions. For example, Higher Education Financing Agency (HEFA) is a joint venture of MoE, Government of India and Canara Bank for financing creation of capital assets in premier educational institutions in India[18]. As on 31st March 2024, close to Rs 40000 crores have been sanctioned to Academic Institutions including IITs and IIMs.

Chapter 4
CONCLUSION AND THE WAY FORWARD

The overarching vision and thought process behind our recommendations for CUSAT is guided by the need to provide the required impetus to boost the University's growth and evolution in the following directions: (1) Strengthening the academic environment of the University by revamping existing programmes and adding new programmes with the objective of achieving student strength of 15,000 and faculty strength of 1,000. (2) Enhancing academic and teaching quality by judicious adoption of technology and restructuring of existing departments and programmes (3) Enhancing quality of research and publication by offering support and incentives to faculty and scholars (4) To provide a substantive emphasis for academia and industry collaboration by actively implementing policies like Professor of Practice, Industry chairs, Joint Projects among others, (5) Improving research projects and consulting assignments (6) Enhancing internal revenue generation through online and executive programmes (7) Making the best out of the opportunities presented by the prevailing Internationalization context and (8) To provide suggestions to create the enabling governance architecture and required infrastructure to facilitate the above. Structurally, we also suggest that future initiatives are best calibrated by taking into account the following: (1) Degree granting courses are best housed in departments or schools which are linked to concerned faculty disciplines (2) Centres are best positioned for conducting research, consulting and for facilitating policy initiatives and (3) The need to exploit scale related advantages along with resource utilization optimization across the University and to align with the central and state perspectives on 4-year undergraduate programs.

In order to provide the necessary impetus for the above, we have suggested a series of initiatives related to governance reforms, enhancing research and teaching quality and furthering industry academia collaboration at CUSAT. These initiatives have been proposed in the report to optimize greater utilization of existing resources at the University and also to foster greater cohesion and collaboration among the various faculties, departments and centres at the University. This will, in our opinion also enhance both the scale of activities at CUSAT particularly through the proposed undergraduate offerings at the University, thereby optimizing the available resources and reducing avoidable duplication of activities. In addition, our proposals aim at promoting

the scope of the activities at CUSAT by leveraging resources within and across departments and faculties by enhancing cross-disciplinary research activities including collaborative initiatives with industry, furthering research incentives and recognizing teaching excellence across the University. In order to further the above indicated initiatives, appropriate administrative reforms need to be initiated as well. CUSAT has more than 750 non-teaching staff deployed across departments and functions. We recommend that an administrative audit and efficiency enhancement study should be conducted to ensure that the University is able to make the best out of the manpower available.

During our visits to the University premises, we had the opportunity to interact with a large number of the faculty colleagues across faculties, schools, departments, and centres. All the concerned departments and centres had presented their suggestions and perspectives. We greatly appreciate these efforts, and the suggestions and ideas they represented. Several of them were farsighted and would in our opinion go a long way to address the future needs of the University. We have provided inputs from the faculty colleagues in separate annexures attached to this report.

In order to execute the various suggestions provided by the various faculties, departments, schools and centres and to take forward these suggestions within the ambit of the philosophy and thrust of the report, t*he committee recommends that a working group be set up in CUSAT to develop an Institution Development Plan (IDP) modelled on the guidelines provided by the UGC*. The suggestions given in this report could be valuable inputs for the IDP development exercise. To facilitate this, a separate compilation of the inputs provided by the various faculties, departments, schools and centres is provided in *Volume 2* of this report. While we have not commented specifically on the proposals and ideas presented by the various faculties, departments, schools and centres, *Volume 1* of the report provides a reflection of our thought process and our perspectives, thereby providing potential roadmaps to implement these suggestions.

We are confident that CUSAT has a bright future, and we believe that these initiatives will go a long away in strengthening the current stature and positioning of CUSAT as one of the leading institutions in the country and globally in future.

ACKNOWLEDGEMENTS

We would like to thank the Vice-Chancellor Prof. (Dr.) M Junaid Bushiri, Prof P G Sankaran, former Vice Chancellor, Dr. Sam Thomas, Director, IQAC, Statutory Officers, Syndicate Members, Deans, Directors of various offices, HODs and all Teaching and Non-teaching staff of CUSAT who generously provided us their valuable time despite their busy schedules and work commitments. Their constructive suggestions and profound insights have been invaluable to us. We would not have been able to accomplish our task without their constant support and encouragement. We would like to express our deep gratitude to team at IQAC who facilitated our every request in connection with this exercise. We would like to place on record our appreciation of the coordinating team who worked diligently along with us to enable us to finalize this report.

ANNEXURES

ANNEXURE I: UNIVERSITY ORDER REGARDING THE CONSTITUTION OF ACADEMIC REVIEW COMMITTEE

File Ref.No.Ac.A3/General/2022

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

(Abstract)

Syndicate Resolution-constitution of a higher-level committee to review the existing programs, courses and curriculum offered by the University in the context of Technological advancement and the terms of reference – Orders issued.

ACADEMIC A SECTION

No.CUSAT/AC(A).A3/2942/2023 Dated,KOCHI-22,01.07.2023

Read:-Item No.710.21 of the minutes of the meeting of the Syndicate held on 20-04-2023

ORDER

The Syndicate vide item read above considered along with the recommendations of the Standing Committee of the Syndicate on Academic Matters, the constitution of a higher-level committee to review the existing programs, courses and curriculum offered by the University in the context of technological advancement.

The Syndicate resolved to formulate the following as terms of reference of the high-level committee to be constituted:

1. To review the existing academic programs.
2. To propose new academic programs in emerging and futuristic areas, with the existing capability.
3. To restructure existing academic systems to introduce academic flexibility.
4. To strengthen institute – industry interactions
5. Introduce new structures, systems and processes, if required, to acquire the goals.
6. Mechanism to address skill gap, promotion of innovations translational research and start up ecosystem.

The Syndicate also had resolved to consider the matter of selecting members to the high-level committee, after further detailed discussion. Based on this, the Vice Chancellor has nominated following members to the high-level committee.

1. Dr. George Thomas, IISER, Trivandrum
2. Dr. Krishna Mohan, IIT, Hyderabad
3. Dr. Reji George, IIM, Bangalore
4. Dr. Rajeev Sukumaran, NIIST, Trivandrum

The Vice Chancellor has also ordered that IQAC is entrusted to coordinate activities of the Committee.

Orders are issued accordingly.

Dr. Meera V *
Registrar

To:

1.The members concerned with covering letter
2.The Director, IQAC-for further n.a
3.All Deans of Faculties
4.The Director,DPR&P
5.Conference Section
6.PS To VC/PVC;PA to Registrar/CE
7.CIRM

* This is a computer generated document. Hence no signature is required.

ANNEXURE II: VISIT OF ACADEMIC REVIEWING COMMITTEE DURING 19th to 20th SEPTEMBER 2023

Details of interactions with University officials/Members of Syndicate/ Members of Statutory bodies and Heads of Departments /Board of Studies Chairman and Faculty Members/ Selected Centres (C-SiS, CITTIC, ACARR) of the Committee

Day 1: 19th September 2023 (Tuesday)				
Start	**End**	**Duration**	**Activity**	**Venue**
9.30 am	9.45am	15 min	Meeting with the Vice Chancellor	VC's Chamber
9.45 am	10.45 am	1 hr	Meeting with Deans & IQAC Members	Syndicate Hall
10.45 am	11.15 am	30 min	Meeting with the Vice Chancellor & the Syndicate	Syndicate Hall
11.15 am	11.45 pm	30 min	Meeting with Statutory Officers (Registrar, Finance Officer, Controller of Examinations)	Syndicate Hall
11.45 pm	1.00 pm	1 hr 15 min	Meeting with other University Officials and inviteddignitaries	Syndicate Hall
2.00 pm	5.00 pm	3 hrs	**Interaction with Heads of Departments/ Board of Studies Chairman and Faculty Members** **I. Faculty of Science** 1. Department of Applied Chemistry 2. Department of Biotechnology 3. Department of Mathematics 4. Department of Physics 5. Department of Statistics **II. Faculty of Environmental Science** 1. School of Environmental Studies	Senate Hall
5.00 pm	6.00 pm	1 hr	Visit/ interaction with the selected centres (C-SiS, CITTIC, ACARR)	Visit / Senate Hall

Day 2: 20th September 2023 (Wednesday)				
Start	**End**	**Duration (in hrs)**	**Activity**	**Venue**
09.30 am	12.30 pm	3hrs	**Interaction with Heads of Departments, Board of Studies Chairman and Faculty Members** **III. Faculty of Social Science** 1. Dept. of Applied Economics 2. DDU Kaushal Kendra 3. Centre for Budget Studies 4. School of Management Studies **IV. Faculty of Humanities** 1. Dept. of Hindi 2. Dept. of English & Foreign Languages **IV. Faculty of Law** 1. School of Legal Studies 2. Inter University Centre for IPR Studies 3. N.R Madhava Menon Centre for Interdisciplinary Research & Ethics	Senate Hall
2.00 pm	5.00 pm	3 hrs	**V. Faculty of Marine Science** 1. Dept. of Atmospheric Science 2. Dept. of Chemical Oceanography 3. Dept. of Physical Oceanography 4. Dept. of Marine Biology, Microbiology and Biochemistry 5. Dept. of Marine Geology & Geophysics 6. School of Industrial Fisheries 7. National Centre for Aquatic Animal Health (NCAAH)	School of Marine Science

ANNEXURE III: VISIT OF ACADEMIC REVIEWING COMMITTEE DURING 26th TO 27th OCTOBER 2023

Details of interactions with University officials/Members of Syndicate/ Members of Statutory bodies and Heads of Departments/ Board of Studies Chairman and Faculty Members of the Committee

Day 1: 26th October 2023 (Thursday)				
Start	**End**	**Duration**	**Activity**	**Venue**
9.30 am	12.30 pm	3 hrs	**Interaction with Heads of Departments/ Board of Studies Chairman and Faculty Members** **Faculty of Technology** 1. International School of Photonics 2. Department of Computer Applications 3. Department of Computer Science 4. Department of Electronics 5. Department of Instrumentation 6. Department of Polymer Science & RubberTechnology 7. Department of Ship Technology	Senate Hall
2.00 pm	4.00 pm	2 hrs	**Interaction with Heads of Departments/ Board of Studies Chairman and Faculty Members** **Faculty of Engineering** 1. School of Engineering 2. Cochin University College of Engineering,Kuttanad (CUCEK) 3. K.M. School of Marine Engineering	Senate Hall
4.00 pm	4.30 pm	30 min	Interaction with representatives of Research Scholars and Post Graduate Students	Senate Hall
Day 2: 27th October 2023 (Friday)				
Start	**End**	**Duration (in hrs)**	**Activity**	**Venue**
09.30 am	4.30 pm		Discussions and Report Preparation	VC's anteroom

ANNEXURE IV: DETAILS OF ONLINE MEETINGS CONDUCTED BY THE ACADEMIC REVIEWING COMMITTEE WITH OFFICIALS OF CUSAT

Sl. No.	Date & Time of the Online Meeting
1	31st July 2023 - 3pm to 5pm
2	5th September 2023 - 2pm to 5pm
3	25th September 2023 - 7.30 pm
4	6th October 2023 - 7.30 pm
5	10th November 2023 - 7.30 pm
6	16th November 2023 – 7.30pm to 8.30pm
7	23rd November 2023 – 7.30pm to 8.30pm
8	20th May 2024 10.30 am to 11.30am
9	22nd July 2024, 6:00 pm to 7 :00 pm
10	20th September 2024 12:30 PM

Endnotes

[1] The Commission for Reforms in Higher Education 2022 (Shyam B Menon Report)

[2] The National Institute Ranking Framework-Ministry of Education accessed from https://www.nirfindia.org/Rankings/2024/Ranking.html (last accessed on 20 January 2025)

[3] University Order No.CUSAT/AC(A).A3/2942/2023 dated 01/07/2023

[4] National Education Policy (NEP), 2020, Ministry of Human Resource Development, Government of India and The Commission for Reforms in Higher Education 2022 (Shyam B Menon Report).

[5] National missions by Department of Science and Technology accessed from https://dst.gov.in/national-missions (last accessed on 20 January 2025)

[6] India Semiconductor Mission (ISM) accessed from https://www.ism.gov.in/ (last accessed on 20 January, 2025)

[7] Accessed from www.meity.gov.in (Last accessed on 20 January,2025)

[8] Accessed from https://dst.gov.in/national-quantum-mission-nqm (Last accessed on 20January, 2025)

[9] P.78, Commission for Higher Education Reforms (2022).

[10] P.41, Such an approach was also advocated in the Commission for Higher Education Reforms (2022) report as well.

[11] Figure 9, P. 98, Commission for Higher Education Reforms (2022).

[12] Commission for Higher Education Reforms (2022), page 89.

[13] Figure 9, P. 98, Commission for Higher Education Reforms (2022).

[14] Accessed from https://respark.iitm.ac.in/ (last accessed on 21 January, 2025)

[15] Accessed from https://www.cusat.ac.in/ (last accessed on 29 January, 2025)

[16] Accessed from https://www.cusat.ac.in/ (last accessed on 29 January, 2025)

[17] https://www.education.gov.in/sites/upload_files/mhrd/files/upload_document/int_he.pdf

[18] Accessed from https://hefa.co.in/ (last accessed on 29 January, 2025)