COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

(Abstract)

CUSAT Vision Document-Resolution of the Syndicate- Communicated-Orders issued.

INTERNAL QUALITY ASSURANCE CELL

No. IQAC/Quality –Initiative/2019 (I) Kochi-22, Dated: 22-03-2019

Read: Outside Agenda item No.11 of the minutes of the 657th meeting of the Syndicate held on 27.12.2018 & 05.01.2019

ORDER

The Syndicate at its meeting held on 27.12.2018 & 05.01.2019, vide paper read above, considered the vision document of the University for the next 15 years (Appendix V) presented by the Vice Chancellor and decided to accept the vision document in principle.

Orders are issued accordingly.

PROFESSOR IN CHARGE OF REGISTRAR

To,

1. Finance Officer/Joint Director, Kerala State Audit Department
2. Director, IRAA/DPR&P/ PDO
3. JR (Academic)/ JR (Finance)/ DR Admin(I/ II/III)
4. IA&A/Conference Sections
5. PS to VC / PS to PVC /PA to Registrar/ PA to CE.
6. Day File/Stock File/File Copy

657 (outside Agenda item No.7)

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

THE VISION PLAN for Next 15 years

A. THE OBJECTIVES :- As per the CUSAT Act 1986, the University shall have the following objectives

(I) to prosecute and promote research in applied science, technology, industry, commerce, management and social science for the advancement of knowledge and for the betterment of society

(ii) to provide facilities and offer opportunities for graduate and post-graduate education in applied science, technology, industry, commerce, management and social science by instruction, training, research, development and extension and by such other means as the University may deem fit;

(iii) to devise and implement programmes of education in applied science, technology, industry, commerce, management and social science that are relevant to the changing needs of society, in terms of breadth of diversity and depth of specialization;

(iv) to serve as a centre for fostering co-operation and exchange of ideas between the academic and research community on the one hand and industry on the other; and

(v) to organize exchange programmes with other institutions of repute in India and abroad with a view to keeping abreast of the latest developments in relevant areas of teaching and research.

In tune with the above objectives and the potential of CUSAT a 15 year vision plan was developed

B THE VISION

Vision: To grow into a University of global repute which attracts the best students, teachers and researchers and provide them with an exemplary learning experience to produce world-class research output as well as trained manpower for the benefit of the society and nation.

Goal: We propose to achieve the goal of being in the top 100 in the World University Rankings in the next fifteen years by steadily building on our strengths and overcoming our weaknesses to make thebest use of the opportunities available. This systematically transforms the University into an institution that is futuristic, quality-conscious and responsive to the demands of aspiring Researchers and Learners.

Strategy: The University shall promote a culture where teamwork is encouraged and innovators and risk- takers are recognised and rewarded for their performance. The University Administration shall work to facilitate research, teaching and extension in all schools/ departments/centres of the University. The University shall, place Research groups of 10 to 20 experts with 30% members from outside the University and 20% members from outside the country to develop the facilities and work on research problems in core areas.

C) SWOT ANALYSIS OF THE UNIVERSITY

STRENGTHS

A University of Science and Technology: focus its attention on Teaching and Research of high quality in the area of Science and Technology.

Unitary Status: unique chance to concentrate on its Teaching and Research Programs and maintain good control over its quality and performance.

High Reputation: helps it in attracting good teachers, students and projects.

Geographical Location: at Cochin, a fast-developing city with ample infrastruture and connectivity

Research and Publication: an excellent track record in research and publication. It has been rated among the top 10 Universities in terms of publication in India.

Research Infrastructure: an enviable research infrastructure through government grants and various projects including international collaborations.

Variety of Departments and Centres: a wide variety of Departments ranging from Marine sciences, Technology, Engineering to Social Sciences, Law and Languages promoting multi-disciplinary approaches and cross functional learning.

Collaborations: a wide collaboration with national and international institutions

Good Administrative Structure: As provided in the CUSAT Act, the University has developed a good administrative structure for governance and support system for the academic and research programmes that it undertakes.

Quality Assurance: quality check in teaching and research by the Internal Quality Assurance Cell (IQAC).

A large well placed supportive Alumni base: Alumni holding very important positions in many academic, research, industry and government organizations.

Good Placements: very good placements that the students graduating from CUSAT

Affordable and quality Education: provides quality education in Science, Engineering, Technology and Management with low fees - fulfils its social obligations and provides access to higher education more inclusive.

Sensitivity to social needs: involved itself in finding Science and Technology based solutions to the problems faced by the society.

OPPORTUNITY

Universities from Developed Countries searching for partners in India:

More learners: students from other States of India as well as from other countries are showing keen interest in pursuing their studies at CUSAT.

Better quality teachers willing to join CUSAT: very good quality teachers and researchers are willing to join the service of CUSAT.

More industry sponsored Projects: The Industry has been showing increased interest in using the expertise available at University for conducting sponsored research which would be of commercial value for them.

More Research scholars with JRF available: many good students showing keen interest in research and later taking up teaching jobs. Most of these students are also able to get scholarships such as JRF from funding agencies.

I.C.T. Based education system usage opportunities at lower cost: The ICT infrastructure put in place with a fibre optic backbone with servers and an internet gateway for the campus has created an environment where ICT can easily be used in the teaching-learning process.

E-Libraries and E-Resources: the research publications, books and other learning materials are available in electronic format

MOOC: supplementing the class room learning at the University for our students as well as providing MOOCs for other learners and enhancing reputation of CUSAT.

Inter department Collaboration: cutting-edge research today takes place at the interface of disciplines rather than purely inside a discipline.

WEAKNESSES

Vacant Faculty Positions: non-replenishment in the number of faculty has affected the performance as expected - now slowly being reversed, with recruitments being done.

Lack of New Hostels: A completely residential University of higher learning can reach greater heights more easily.

Financial autonomy: procedural delays often inhibit the expected progress in terms of meeting objectives on time.

More students from the state only: Being a State University most of the students come from this State.

Lack of visibility of the courses: lack of awareness and visibility of CUSAT among the general public affects student intake.

THREATS

Private Deemed Universities with more funding: charging very high fees along with attractive infrastructure to attract the rich students.

Students demanding better physical facilities: the overall improvement in the standard of living warrants increased physical infrastructure .

More choices for all: the learners have many institutions to choose from **Other institutions offering similar courses:** many of the other institutions have copied the courses with high demand

Entry of Foreign Universities:

D). THE FUTURE TARGETS

Having conducted the SWOT analysis, the University proposes to build on its strength and use its strengths to make the best use of the opportunities

1. **WE PROPOSE AN AMBITIOUS ACADEMIC – CUM - RESEARCH PLAN** covering current thrust / niche area(s) of expertise as given below. The theme of academic and research evolve around the concepts of inter-, multi-, intra-, and trans- disciplinary in nature.

Five domains have been identified.

i) Basic Sciences: is a combination of Life Sciences, Chemistry, Physics, Statistics and Mathematics. Special emphasis will be given to Ayurvedic life science which from the point of view, is from Systems Biology. Basic science research, often called fundamental or bench research, provides the foundation of knowledge for the applied science that follows. This type of research encompasses familiar scientific disciplines such as biochemistry, microbiology, physiology, and pharmacology, and their interplay, and involves laboratory studies with cell cultures, animal studies or physiological experiments. Basic science also increasingly extends to behavioural and social sciences as well, which have no less profound relevance for medicine and health

.In the absence of information and insights generated from basic research, it is difficult to envision how future advancement in treatment of disease and disability will occur; physicians would increasingly be in the position of mechanics who do not know how

engines work, or programmers who do not understand how computers store and compile information. Basic research is also a source for new tools, models, and techniques (e.g., knockout mice, functional magnetic resonance imaging, etc.) that revolutionize research and development beyond the disciplines that give rise to them.

Some of the major areas which have attracted the attention of the researchers in the faculty of departments of CUSAT is cutting-edge ideas in the field of Energy, Machine Learning, Orthomolecular therapy. The establishment of a **Centre for Interdisciplinary studies in Basic Sciences (CIBS)** is a vision formed in the concept of incorporating the research under multidisciplinary fields like Chemistry, Physics, Life Sciences, Mathematics, Statistics and Environmental Science under one umbrella

ii) Engineering Sciences & Technology: This will be considered as a major area of research with the likely development for the next 15 years. All UG/PG projects as well as research work could be integrated into a single platform. Ideas would be formulated taking positive clues from National Institutes of repute.

Technology and Engineering is a power field, field with the capability to change the world literally and figuratively. Engineering Science, together with Technological advances certainly has the capability of changing the perspective with which we view the world. Research in the field of engineering and technology is an approach to the world, a critical way to understand and explore and engage with the world. Many of the world's most significant engineering challenges will be met decades in the future by the next generation of engineers and scientists. To inspire and prepare today's students to become tomorrow's innovators; we must bring forth new ideas and avenues in the field of Engineering Science and Technology. CUSAT has envisioned a research proposal whereby multiple disciplines in the engineering field can conjoin and conceive a research group which deals with innovations in the engineering as well as technological domain. CUSAT presents research ideas that can help the future generation in multiple avenues.
The establishment of a **Centre for Interdisciplinary studies in Engineering Sciences and Technology (CIEST)** is a vision formed in the concept of incorporating the research under multidisciplinary fields of all engineering and technology fields under one umbrella.

iii) Scientific computing: This field is developing into a major area of interest, typically dealing with big data, economics, genetics, environmental modelling and alike. We contemplate of proposing a full-fledged centre which could be similar to the original model

of CDAC Pune, a pioneer in the area. This will set a new pathway to achieve international recognition. Recognizing that computational modelling , high performance computing and data science is a fundamental research area of the imminent future; the University seeks to set up a world class computational/data analysis facility to address emergent problems of national Cochin University of Science & Technology and global importance in the field of science and engineering. This new effort will provide the same importance to computational science as experimental and theoretical in the scientific discovery by conducting fundamental and applied research. The work is envisaged to be carried under **the Centre for Interdisciplinary studies in Scientific Computing(CISC)**.

iv) Marine Science: This area is relatively younger compared to progressed achieved in other domains of Sciences. Factually, only a few thousands among six billion get involved in this crucial science field, yet the importance of the oceans in control of physical climate, food resources and bio-diversity are being more widely recognized and valued every day. To young and old, this area offers exciting opportunities to brave the hostile environment while making a mark in human endeavours.Some of the major areas which have attracted the attention of the researchers in the faculty of departments of CUSAT are Biological impacts of climate change ,drug discovery from marine organisms, the cost effective culture and mass production of biofuels from algal blooms etc. The establishment of a Research group for Ocean Biogeochemistry and Ecosystems (OBE) is a vision formed in the concept of incorporating the research under multidisciplinary fields like physics, chemistry and biology using leading modelling and instrumentation techniques to understand ocean biogeochemistry and biodiversity.

Food Safety is yet another emerging area in which safe food production, handling, processing, marketing and consumption requires utmost care and advanced technologies. The aim being food security, through production and management of nutritious food for the growing population around the world. A Research group in Food Safety & Food Security is proposed with this in mind. An overview of the proposed research areas in marine sciences is intended to be integrated into a single umbrella under the **Centre for Interdisciplinary Studies in Marine Science (CIMS).**

v) Humanities and Social Sciences: Some of the major areas which have attracted the attention of the researchers in the faculty of departments of CUSAT is cutting-edge ideas in the field of Languages,Social Sciences as well as Law. The establishment of a **Centre for Interdisciplinary studies in Humanities and Social Sciences (CIHSS)** is a vision

formed in the concept of incorporating the research under multidisciplinary fields like IPR, Law, Management and Languages under one umbrella. The long existence of Hindi and Legal Studies is noteworthy in this Science and Technology University. Emphasis is given to accommodate more languages as well as advance heritage, with a modern outlook while preserving all traditional and cultural values. Taking into consideration the development of legal frame work and the role it plays in a modern society we have developed the area of legal studies with special emphasis on IPR. The Universityhouses the oldest Business school in South India. The new proposals shall cover major areas such as Family management, Small port management, Behavioural science, Macroeconomics and so forth.

2. FACULTY: STUDENT RATIO. The current Faculty: Student ratio is 1:16 in UG and 1:8 in PG. The sanctioned strength is 572. Apart from this strength, the University has started a scheme for appointment of Adjunct Professors. Professionals from Industry and even retired teachers can be appointed till they reach an age of 70 years. The University plans to recruit up to 20% more than the sanctioned strength in this manner. It is also proposed to invite foreign faculty, provide teaching assistantships and such other schemes which will result in Faculty: Student ratio to 1:10 in UG and 1:6 in PG.

Plan

A). **An Industry Academia Interaction Cell**

a) Instituting Professional Chairs with support from Industry

Industry experts are engaged as visiting faculty for post graduate programmes and a few under graduate programmes. Initiatives have been made to institute Professional chairs sponsored by industries in the various departments/schools of the University. **An Industry Academia Interaction Cell** of the University will proactively engage with the industry in this direction. These chairs will be instituted in such a way that qualified and experienced industry experts are recruited by the University for a tenure track period.

Target: The target is 10 Chairs in the first five years with an addition of 15 more chairs in the next five and ending with an addition of 10 more chairs at the end of 15 years.

b) Appointment of Experts from Industry and Government as Adjunct Professors – workshop of Highly skilled and experienced professionals from industry and government will be appointed as Adjunct Professors in the various Schools/Departments of the University. These Professors will offer specialized courses or a part of the course in the curriculum to under graduate and graduate students and also assist in setting up industry oriented specialized centres at the University.

Target: The target is 50 Adjunct Professors in the first five years with an addition of 60more Adjunct Professors in the next five and ending with an addition of 50 more Adjunct Professors at the end of 15 years.

B) **Performance based Tenure track Asst. Professor** – The present practice of contract teachers be modified as a five year tenure track Assistant Professorships with direction to bring in external funded projects. They have to undertake the teaching load of Asst. Professors and will be eligible for research guidance of the project fellows for Doctorate – salary of Asst Professor – continuation after the first year based on projects awarded.

C). Centre for International relations

Plan to provide scholarship to meritorious Indian and foreign students.

To reward outstanding achievement and to help ensure that fears about finance do not constrain prospective international students from considering study at the University, CUSAT offers a number of scholarships. Both international students and domestic students are eligible for the scholarship. The eligibility, funding and selection process will be available on the University website.

The Government of India offers a number of scholarships every year to international students who wish to pursue their studies in India. Offer of scholarships are sent to the respective Governments through Indian diplomatic missions abroad. Nominations are received from the respective Governments in the Indian diplomatic missions concerned. The information on such scholarships and schemes can be availed from the Indian missions abroad.

D). Teaching Assistantship Linked Scholarships

The University encourages students to assist teaching faculty in their department and earn while studying. The host department shall offer these positions each year and students are encouraged to participate in it and benefit. The terms and conditions for these positions will be made available to all the students by the respective departments

E). **IQAC/ Administrative Cell** to plan for getting accreditation from National and International Agencies as well as marketing and promotion. The University plans to re-engineer its processes and implement paperless procedures for administration related transactions. This will be done along with implementation of ISO 9000 in the departments. All Engineering courses will be accreted by NBA and the University and its schools and

departments will participate in reputed ranking surveys regularly and obtain the feedback to improve the teaching, learning and research system continuously.

F). Alumni The University shall use its teachers and its Alumni to help in recruiting good teachers, researchers and students. It will also organise seminars regularly to give an opportunity for potential collaborators to visit and work or study with us. The physical facilities will be continuously improved and new facilities will be added.

- Endowments and scholarships in the names of Alumni or Batches
- Crowd funding of initiatives by using donations from Alumni
- "Academic Adoption Program" where an Alumnus adopts a current student and funds the education and mentors the student to reach a successful career
- Placement and Training support from Alumni including summer internships
- Sabbatical of Faculty spent partly in Organizations with Alumni holding important positions

G). Performance Recognition. Performance will be given great importance and a system of setting goals for all teachers and researchers is actively considered. Monitoring and feedback measures will improve the performance of all learners, researchers and teachers. The conduct of courses and programs will also be re-evaluated and poorly performing programs and courses will be dropped in favour of the better performing ones. Continuous learning and collaboration with researchers from other disciplines will be encouraged and rewarded.

H) Planning and Evaluation Committee. A high-level Planning and Evaluation Committee to be set up by the University which will have reputed Alumni as one third of its members, the other one third will be representatives of key Recruiters of our students and the remaining will be senior Academicians and Researchers of the University. This committee chaired by the Vice-Chancellor will meet at least twice a year. Steps are being taken to set up a special social media portal for Alumni to connect among themselves and their batchmates as well as the University. This will make information exchange easy and modern.

I) Research Schools.

For cutting edge scientific research we have conceived a plan of 15 to 20 people working together. We have identified unique areas where individual excellence is existing and will

attempt to identify researchers from other universities in the respective areas. All of them will be working on one problem, which can be expected to produce high quality research outcomes in 15-20 years. This will be a long-term problem, which can be part of a large mission where national laboratories and research groups outside the country can also collaborate.

CUSAT is instrumental in the development of research methodologies in domestic as well as international domains. But, most of these high-end innovations get limited into scientific domain itself, without any major impact on the lower strata of the society. A humble way to assist the common man, is to create programs where innovations from the labs can be effectively utilised to alleviate their burdens. For example, the Lab to Land semester program will effectively mesh the high-end innovation with the common man's problem(s).

We are mandating that within the cohesive research groups of about 20 each, one third would be from likeminded researchers across the top 500 universities. For teaching and research collaboration, we have decided to bring in eminent faculty from universities, domestic and international. The proposal is designed in such a way that the external faculty will dedicate their free time (two-month semester break) efficiently creating a twinning program. This will also help to create tailor made course modules satisfying the industrial requirements.