Cochin University of Science and Technology

REPORT OF
THE ACADEMIC REVIEW
COMMITTEE
Volume – II

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

1. INTRODUCTION

Volume 2 of the report 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 at CUSAT.

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, 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 suggestions given in this report could be valuable inputs for the IDP development exercise. While we have not commented specifically on these 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 the suggestions that are indicated in this report from the various faculties, schools, departments and centres.

2. PROPOSALS FOR NEW PROGRAMMES AND COURSES SUBMITTED BY DEPARTMENTS

2.1 DEPARTMENT OF APPLIED CHEMISTRY

CERTIFICATION COURSE – I

Name of the proposed Programme	Instrumentation and Analytical Training on Raman Spectroscopy
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	Two weeks
Description of the programme proposed	The training programme titled Instrumentation and Analytical Training on Raman Spectroscopy provides hands-on training on different aspects of instrumentation, data processing and analytical method development. Participants will learn about the working principle of the Raman spectrometer, the characteristics of essential components inside the Raman spectrometer, how the data obtained from Raman spectrometer can be processed and it can used for particular analytical applications. They will also develop the necessary skills and expertise on system development, data preprocessing, and spectroanlytical tools benefiting them for industrial and public sector organizations. **The objectives of the programme include** • Learn the fundamental principles of vibrational Raman spectroscopy • Identify key components inside Raman spectroscopy and their essential characteristics. • Learn tools and methods for low frequency and high frequency noise from Raman spectra. • Learn SERS signal enhancing method • Use Raman spectra for qualitative analysis • Method development for quantitative analysis

Justification for launching the programme proposed	Analytical chemistry is one of the important fields being widely used in various industries and the public sector for testing and analysis of chemicals, consumer products, disease biomarkers and pathogens, environment and forensic science. It is also an integral part of the basic R&D organizations. Raman spectroscopy is one of the spectroscopic techniques that has the capability for non-destructive and native analysis and is gaining more interest in the analytical sector. However, apart from the fundamental principles, the application and instrumentation Raman spectroscopy I rarely taught academic curriculum. Project Management is an exciting profession. Most of the organizations in the knowledge economy operate on a project mode. Moving from one project to another, an employee constantly faces new challenges, new processes, new people, and new situations. Solid project management knowledge and skills, will make you more successful than ever – whether it is the performance of your team, your own career progression or a new business start-up. Project management skill is identified a top notch skill in the competitive world where companies are struggling to deliver project results within various organizational constraints balancing Time, Cost and Scope requirements. The programme will be best suited for • Young professionals and university graduates interested in analytical science • Anyone who wants to develop or enhance their knowledge and skills in the analytical chemistry sector and optical instruments • Anyone working / looking for a job in companies and public institutions dealing with chemical analysis, quality control and assurance • Entrepreneurs in the analytical sector • Teachers and Academicians
Other institutes offering similar programmes	CSIR NCL
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of fresh graduates in R&D institutes, chemical analysis public and private sector, and quality control and assurance departments in industries. It will give additional competencies to working professionals
Partnership with Industry if any for the proposed programme	We will seek partnership with some of the like industries in analytical sector and Raman spectrometer (e. CheckAg, Metrohm, Comteck) when the program

	is about initiate.
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	20
Proposed fees for the proposed programme	Rs 10000 Industry participants: 20000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERTIFICATION COURSE – II

Name of the proposed Programme	BEST PRACTICES AND ADVANCED TECHNIQUES IN ORGANIC SYNTHESIS
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid [Regular teaching and tutorials will be provided both in online and offline mode. Hands-on training on synthesis, purification, and analytical techniques will be given in the Laboratory.]
Duration of the programme proposed	3 months
Description of the programme proposed	The certificate programme titled *Best Practices and Advanced Techniques in Organic Synthesis* focuses on synthesising useful organic products ranging from simple to complex structures, which involve various reaction methods, separation and purification, and qualitative and quantitative analysis using instrumental techniques. The objectives of the programme include • To impart excellent experimental skills in organic synthesis, separation & purification, and analysis of organic compounds. • To provide knowledge on the usage and applications of contemporary analytical techniques employed in pharmaceutical analysis and quality control. • To provide hands-on experience in the advanced techniques of organic synthesis. • To equip the students with skills required for industries such as the pharmaceutical industry, food

	industry, cosmetics, etc., based on organic fine chemicals.
Justification for launching the programme proposed	India is an important player in the global production of pharmaceuticals, with an annual turnover of nearly 20.88 billion dollars. Among industrial job providers, the chemical industry is in the number two position. The profile of a suitable candidate for a chemical industry job requires training in good laboratory practices, quality control certifications, expertise and skills in advanced synthesis and analytical techniques. A typical postgraduate curriculum can only provide certain basic laboratory practices. Only a skill-based programme can equip a UG student as a Lab Chemist and a PG student as a Scientist. Department of Applied Chemistry, Cochin University of Science and Technology, aims to offer a skill development program of this kind on *Best Practices and Advanced Techniques in Organic Synthesis,* which can bridge the gap between academia and industry. The course is intended to impart knowledge on the advanced techniques used in the synthesis, separation & purification, and analysis of organic compounds on the lab scale. The proposed course will train a group of students to get good theoretical knowledge and practical skills to work in various established industries. It mainly focuses on skill development required for the present and future job market related to organic chemistry. The course is specially targeted to graduate/ post-graduate students having chemistry/pharmaceutical background.
Other institutes offering similar programmes	NIIST Trivandrum, National Institute of Pharmaceuticals Education and Research (NIPER)
Expected graduate outcomes of the proposed programme	After completion of the programme, candidates will be able to get appointed to various scientific and technical positions in different organisations and industries spread across the country. The programme will cater to the industry's emerging needs in the S & T sector with a skilled workforce.
Partnership with Industry if any for the proposed programme	Planning to have partnership with chemical industries in Kerala.
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs. 10000
Additional Infrastructural requirements if any needed for the proposed	NIL

programme	

MOOC PROGRAMME – I

Name of the proposed Programme	Transition Metals: Chemistry and Applications in Organic Synthesis
Nature of the programme proposed	MOOC course
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	4 months
Description of the programme proposed	This course is designed to cover all the aspects, including the structure, bonding and properties of transition metal complexes; principle and mechanism involved in transition metal-mediated transformations; and the construction of organic molecules for various applications by applying transition metal complexes. In brief, the course will impart deep knowledge in organic transformations *via* transition metals.
Justification for launching the programme proposed	Transition metals are excellent catalysts in performing crucial organic transformations, which allows access to chemicals with important applications. Industries and academia require people with profound knowledge in transition metal catalyed organic transformations to design and synthesise simple to complex organic molecules for drug development and applications of functional materials. Target audience: Postgraduate students of various institutions across India and abroad.
Other institutes offering similar programmes	MOOC course offered by NTPTEL on SWAYAM platform.
Expected graduate outcomes of the proposed programme	After completing the course, candidates will be able to apply transition metal complexes for various organic transformations to synthesise important organic molecules useful in various fields and have a tremendous impact on society. There is a huge demand in industries and academia for people skilled in transition metal-catalysed reactions to design and develop simple to complex organic molecules. This course will be an additional qualification for the participants to get jobs in industries and academia.
Partnership with Industry, if any, for the proposed programme	Nil

Partnership with foreign universities, if any, for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	100
Proposed fees for the proposed programme	500
Additional Infrastructural requirements, if any, needed for the proposed programme.	NIL

MOOC PROGRAMME –II

Name of the proposed Programme	Advanced Chemical and Instrumental techniques for industrial application
Nature of the programme proposed	MOOC certification course
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	4 weeks
Description of the programme proposed	This MOOC certification programme aims to train and develop competent manpower so as to acquire skills needed for certain industrial positions and to develop employability among the undergraduates and postgraduates in chemistry. **Programme Outcomes** On successful completion of the course, students will be able to P.O.1: Acquire systematic and coherent understanding of the fundamental concepts of chromatography, voltammetry and analysis of various real samples P.O.2: Demonstrate the basic principles of instrumental analysis P.O.3: Execute experimental routines for the analysis P.O.4: Operate advanced instruments like HPLC, GC-MS, electrochemical workstation and related soft-wares to execute the real sample analysis
Justification for launching the programme proposed	Train and develop competent manpower for industries. This would create employability among students of our PG programme as well as interested graduate and postgraduate students outside CUSAT.
Other institutes offering similar programmes	Online course in Udemy
Expected graduate	After the successful completion of the programme, the

outcomes of the proposed programme	students will find placements in industries where HPLC and GC are widely used.
Partnership with Industry if any for the proposed programme	Agilent and Spinco Biotech
Partnership with foreign universities if any for the proposed programme	Institute of Good Manufacturing Practices India
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs. 20,000/-
Additional Infrastructural requirements if any needed for the proposed programme	Availability of existing HPLC, GC-MS and electrochemical workstation

2.2 DEPARTMENT OF APPLIED ECONOMICS

PGPROGRAMME

Name of the proposed Programme	**MSc. Applied Economics**
Nature of the programme proposed	Regular Post Graduate degree
Mode of delivery of the programme proposed	Offline/ Hybrid
Duration of the programme proposed	2years
Description of the programme proposed	The proposed course is well-engineered with a balanced emphasis on quantitative economics, social and developmental aspects. This rigorous course will enable students to become trained economists through empirical and data analytics teaching. Furthermore, the course enables the students to choose either industry or academics for their career pursuits. This is a carefully designed course with adequate coverage of theoretical and empirical facets, equipping students to take up responsibilities and deliver effectively in academics, corporate and public policy leadership roles in the country and elsewhere. **Objectives and learning outcomes** This program aims to prepare young minds for industry, academia and policymaking. Students can also start consultancies with their strong subject knowledge and exposure that they get from this course. By the end of the programme, students will have knowledge and assimilation of - Key concepts of Economics, Finance and Econometrics - Skills etrelating to data analytics and economic policy-making **Highlights of the course** 1. The programme is of four semesters, focusing on theoretical foundations in the first year and practical applications in the second year. 2. First and second semesters of the programme encompass basic and advanced data analytics course which is essential for industry requirements. 3. The course's main objective is to cater to the needs of industry and academia simultaneously. Thus, this the demand requirement of the industry/corporate as well as academics. 4. The business, finance of economics will give them an added advantage to enter into various career streams.

	5. The course is redesigned in such a way to include all the applied and practical aspects of economic learning. Furthermore, a paper on public policy will enable students to make efficient economic decision-making.
Justification for launching the programme proposed	The economic landscape of teaching and learning has undergone a massive change with big data analytics and decision-making processes. In such a scenario, a deviation from the traditional approach to learning economics needs to be changed. There designing of the course satisfies the applied aspects of learning economics. **Target Audience** ● Students with a background of BSc.Mathematics, Statistics, B. Com, BBA, BA Economics with quantitative economics specialization.
Other institutes offering similar programmes	Madras School of Economics, Indian Statistical Institute, Indira Gandhi Institute for Development Research (IGIDR), Gokhale Institute of Politics and Economics, Symbiosis School of Economics, Pune.
Expected graduate outcomes of the proposed programme	The MSc. Applied Economics course quite broad and includes financial analysis, investment management, risk management, financial modelling, and quantitative analysis. Students will be able to work in financial institutions such as banks, asset management firms, hedge funds, and insurance companies, public policy making and academia.
Partnership with Industry if any for the proposed programme	Consultancies like Crisil, Care Ratings, etc.
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 20)	20 (Current strength) of MA (Applied Economics) (Upto 25 students can be considered with the present facilities)
Proposed fees for the proposed programme	30,000 per Semester

Additional Infrastructural requirements if any needed for the proposed programme	Furnishing of an existing room with facilities like Smart board, furniture and 15 computers

CERTIFICATION PROGRAMME

Name of the proposed Programme	**Managing Personal Finances**
Nature of the programme proposed	**Certification Programme**
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	25Hours
Description of the program proposed	The certificate programme entitled, Managing Personal Finances is a comprehensive introduction to basic concepts of consumer behaviour under the circumstances of risk and uncertainty, basics of financial planning instruments, popular investment products and a venues as well as the economic environment. The certification aims to meet the following objectives: 1. To understand the basic concepts on behavioural finance and personal finance 2. To become acquainted with various investment avenues catering to the needs of various age cohorts and life phases 3. To have an understanding on tax planning 4. To understand the retirement planning 5. To instil the capability to evaluate the income stream, and expenditure and enable them to formulate budget plans for successful financial planning.

Justification for launching the programme proposed	Managing personal finances is a crucial aspect for students as well as individuals just starting to earn. Mostly students and mid-aged career builders are ignorant about the investment avenues and the need for timely investment as a part of financial management. Through the launch of this programme, we target the following people to take advantage of this course: 1. Students from Economics, Management and Commerce with a basic understanding of economic and finance concepts. 2. Young professionals who want to know about managing personal finances. 3. Any middle-aged professionals who are keen in understanding the concepts and its practical implications. **Admission Criteria:** Bachelor's degree in Economics/Commerce/Management/Technology or related fields. Prior coursework in basic economics is recommended.
Other institutes offering similar programmes programs	Udemy, Coursera
Expected graduate outcomes of the proposed programme	With the basic knowledge earned from this certification, they can appear for certified financial planner exams and get approval for practice.
Partnership with Industry if any for the proposed programme	Possible some engagements with Certified Financial Planners
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	5,000
Additional Infrastructural requirements if any needed for the proposed programme	Nil

MOOC PROGRAMME – I

Name of the proposed Programme	**INDUSTRIAL ECONOMICS**
Nature of the programme proposed	**MOOC**
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	30 Hours
Description of the programme proposed	The programme aims at a graduate and post-graduate level introduction to the subject of industrial economics. It comprehensively covers theoretical and empirical aspects of strategic interaction between firms and determinants of industrial structure. It discusses the role of public policy in the context of competition, industrial policies and regulations. The course structure enables the students to understand the theoretical underpinnings and can be used to analyse the practical issues related to industrial economics. The theory is supplemented with empirical evidence, implications for public policy and the formation of business strategies. The course will be beneficial for students from technology, management and social sciences. The wider objectives of the programme include: 1. To understand the organizational forms and motives of the firms. 2. To comprehend the elements 3. To become acquainted with theories of market concentration. 4. To learn the concepts of diversification, integration and merger. 5. To understand the industrial finance and accounting. 6. To learn the pricing and investment strategies of the firms. 7. To comprehend the industrial location analysis 8. To learn the government policies and regulations related to the industry. 9. To understand the alternative approaches to the theory of firms.

Justification for launching the programme proposed	Industrial economics is an a distinctive branch of economics that deals with the economic problems confronted by firms and industries as well as their interactions with the wider society. Since it covers aspects like the industrial climate of the country, demand and supply analysis, various business parameters, market analysis, business policy and decision-making, the course caters to the needs of students from Commerce, Management, Technology and Social Sciences backgrounds. It gives a sense of industrial analysis from the economic purview. **Admission Criteria:** Bachelor's degree in Economics/Commerce/Management/Technology or related fields. Prior course work in basic Economics is recommended. **Targeted Audience**: It offers an opportunity for students from the canvas of business and technology. There are industrial economists who analytically deal with the specific toolkits for provide hindsight into the functioning of industries in varied market scenarios.
Other institutes offering similar programmes	International Technical Universities are providing this course. Eg. Technische Universitate Berlin.
Expected graduate outcomes of the proposed programme	It will be an advantage for students aiming to join as Business Analyst, Market Analysts and Industrial Economists.
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	Rs.3,500 to Rs.5,000
Additional Infrastructural requirements If any needed for the proposed programme	Nil

MOOC PROGRAMME – II

Name of the proposed Programme	**Economics of Labour Market**
Nature of the programme proposed	**MOOC**
Mode of delivery of the programme proposed	**Online**
Duration of the programme proposed	7-9weeks
Description of the programme proposed	This meticulously structured course is geared to provide students with an understanding of the labour market's economics. The programme is segmented into five units. Unit-1 delves into the supply-side dynamics, focusing on the theory of individual labour supply. Unit-2 shifts focus to labour demand, addressing both short-term and long-term employment decisions and labour market equilibria. Unit-3 elucidates the location of labour and also touching upon incentive pay and fringe benefits. Unit-4 deals with the multi-faceted topic of unemployment, its types, and theories related to job search and structural unemployment.
Justification for launching the programme proposed	The dynamics of labour markets necessitate a keen understanding of its theoretical and practical aspects. This course caters to that need. **Admission Criteria:** Bachelor's degree in Economics or related fields. Prior coursework in basic economics is recommended. **Target Audience:** The course is tailored for postgraduate students, researchers, HR professionals, policymakers, and economic analysts. Given the course's depth and breadth, it's especially pertinent for those seeking to specialize in labour economics or related policy-making.
Other institutes offering similar programs	· Harvard University (Online Course through EdX) · London School of Economics (LSE) (On-campus Programme) · University of California, Berkeley (Online Programme)

Expected graduate outcomes of the proposed programme	1. Intermediate knowledge in labour market dynamics 2. Understand labour market structures and its implications on wages and employment 3. Enhanced capability to contribute to labour economics debates and discussions.
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum25)	30
Proposed fees for the proposed programme	₹3500
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.3 DEPARTMENT OF ATMOSPHERIC SCIENCE

PG PROGRAMME

Name of the proposed Programme	MSc Data Analytics in Climate Sciences
Nature of the programme proposed	New degree
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	2 Year
Description of the programme proposed	**Program Overview:** Climate change is one of the most critical challenges facing the world today. There is an increasing demand for professionals who can leverage data science techniques to analyze and address climate-related issues. However, currently, no program in India provides a comprehensive education in data science with a strong specialization in climate sciences. The proposed master's program in data analytics with a focus on climate sciences at Cochin University of Science and Technology is designed to fill this gap. It will offer students a unique blend of data science fundamentals, advanced analytical techniques, and specialized knowledge in climate sciences. This program will equip graduates with the skills required to make data-driven contributions to climate research, environmental management, disaster mitigation, and renewable energy sectors. **Scope and Uniqueness:** 1. **Comprehensive Data Science Foundation:** Our program will cover core data science topics, including statistical analysis, machine learning, data visualization, and big data analytics, ensuring that students have a strong foundation in data-driven methods. 2. **Specialized Climate Sciences Courses:** Uniquely, our program will offer specialized courses in climate sciences, covering topics such as atmospheric dynamics, climate modeling, climate data analysis, and climate change mitigation. These courses will provide students with in-depth knowledge of climate systems and the ability to apply data science

	techniques to climate-related problems.
	3. **Interdisciplinary Approach:** The interdisciplinary nature of this program will encourage collaboration between data scientists and climate scientists. It will facilitate the development of innovative solutions to address climate challenges effectively.
	4. **Hands-On Experience:** Practical experience will be a key component of the program. Students will work on real-world climate data sets, conduct research projects, and engage in industry internships to apply their knowledge and skills.
	Why CUSAT: Cochin University of Science and Technology has a distinguished reputation for its commitment to excellence in climate science education and research. Our university's state-of-the-art facilities, experienced faculty, and collaborative research environment make it the ideal institution to pioneer this unique program.
	The proposed Master's program in Data Science with a Focus on Climate Sciences will be a ground breaking addition to India's higher education landscape. It will address a critical need for professionals who can leverage data science to address climate challenges.
Justification for launching the programme proposed	**Market Viability:** The proposed Master's program in Data Science with a Focus on Climate Sciences is strategically positioned to meet the growing market demand for professionals with expertise in climate data analytics, a field that intersects data science and climate sciences. The market viability of this program is evidenced by several key factors:
	1. **Rising Demand for Climate Data Experts:** Climate change and its impact on various sectors, including disaster management, renewable energy, agriculture, and policymaking, have spurred a high demand for experts who can analyze and interpret climate data. Professionals with skills in data-driven climate science are in increasingly high demand.
	2. **Government Initiatives:** Governments

worldwide are investing in climate research and climate action plans. This program will produce graduates who can contribute to these initiatives, making them highly attractive candidates for government positions and research institutions.

3. **Private Sector Opportunities:** Environmental consulting firms, renewable energy companies, and organizations focused on climate risk assessment are seeking professionals who can leverage data science to inform decision-making. Our program will equip graduates with skills directly applicable in the private sector.

4. **International Relevance:** The global nature of climate change ensures that the skills and knowledge acquired by graduates of this program will have international relevance. They will be well-prepared to contribute to global climate science initiatives and collaborate with international organizations.

Admission Criteria:

To ensure that the program attracts candidates with the necessary background and motivation, the admission criteria will include the following:

1. A Bachelor's degree in Science in any of the following fields: Physics, Statistics, Mathematics, Computer Science, or B.Tech/B.E

2. Candidates should have studied Physics and Mathematics as majors or minors at the undergraduate level.

Target Audience:

The program is designed to cater to a diverse group of individuals, including

1. Fresh / Recent graduates with a bachelor's degree in relevant fields.

2. Working professionals in government agencies, research institutions, environmental consulting firms, and renewable energy companies seeking to enhance their skills and advance their

	careers in the growing field of climate data analytics. 3. International students interested in studying climate data analytics in the Indian context and applying their skills globally.
Other institutes offering similar programmes	No such courses
Expected graduate outcomes of the proposed programme	Upon completion of the proposed Master's program, students will acquire: 1. **In-Depth Climate Science Knowledge:** Graduates will gain a comprehensive understanding of climate systems, including atmospheric and oceanic processes, and their role in climate change. 2. **Proficiency in Data Science Techniques:** They will develop proficiency in a wide range of data science techniques, including statistical analysis, machine learning, data visualization, and big data analytics, tailored for climate data applications. 3. **Data Handling Skills:** Graduates will acquire the skills necessary to collect, process, and analyze climate data from diverse sources, such as satellites, weather stations, and climate models. 4. **Physics-Guided Modeling:** They will be capable of integrating physical principles into machine learning and data-driven models for climate prediction and analysis, enhancing the accuracy and interpretability of their models.
Partnership with Industry if any for the proposed programme	Partnership with Industries will be explored
Partnership with foreign universities if any for the proposed programme	Willing to collaborate with foreign Universities
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	50000 per semester
Additional Infrastructural requirements if any needed for the proposed programme	A new Computer Lab (25 Desktop Computers) and a data server. CUSAT's upcoming KIIFB-funded High-Performance Computing (HPC) facility will also be utilized.

CERTIFICATION COURSE

Name of the proposed Programme	Remote sensing and GIS
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	30 hours
Description of the programme proposed	A Remote Sensing and Geographic Information Systems (GIS) Certificate Program is a specialized educational offering designed to equip individuals with the knowledge and skills needed to work effectively in the fields of remote sensing and GIS. This programme is suitable for students, professionals, or anyone interested in acquiring expertise in these technologies. The objectives of the programme include • Certificate holders are better equipped for careers in fields such as urban planning, environmental management, agriculture, forestry, and disaster management. • Participants gain practical skills in handling geospatial data, which can be applied to a variety of industries.
Justification for launching the programme proposed	There is a rapidly increasing demand for professionals with expertise in remote sensing and GIS across various industries, including agriculture, environmental management, urban planning, disaster response, forestry, and more. Remote sensing and GIS technologies play a critical role in monitoring and managing environmental issues such as climate change, natural disasters, and resource conservation. Training individuals in these technologies contributes to better environmental management and sustainable development. As these technologies become integral to decision-making processes, the need for skilled individuals to analyze and interpret geospatial data is on the rise. Advances in remote sensing technologies and GIS software have made these tools more accessible and user-friendly. However, there is a need for structured education and training programs to help individuals harness the full potential of these technologies and stay updated with the latest developments. Launching of remote sensing and GIS technologies play a critical role in monitoring and managing environmental issues such as climate change, natural disasters, and resource conservation. Training individuals in these technologies contributes to better environmental

	management and sustainable development. The programme will be suited for • Students perusing graduation/post-graduation in earth and environmental science related subjects. • Anyone who would like to understand the geospatial data and its various application. • Research scholars perusing their PhD in Earth Science, Civil engineering, Agricultural Sciences, Forestry, Disaster management etc.
Other institutes offering similar programmes	IIRS, Dehradun
Expected graduate outcomes of the proposed programme	Graduates will be skilled in data acquisition, storage, organization, and retrieval, ensuring the quality and accessibility of geospatial information. Graduates will possess advanced spatial analysis skills, including spatial statistics, geoprocessing, and modeling, allowing them to extract valuable insights from geospatial data.
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	Rs 5000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.4 DEPARTMENT OF BIOTECHNOLOGY

CERTIFICATION COURSE – I

Name of the proposed Programme	Next Generation Sequencing
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	7 days (42 hours)
Description of the programme proposed	This certification programme provides a strong understanding of the different Next-generation sequencing platforms, which have become the premier tool in genetic and genomic analysis. The course will also provide a better overview of the different public datasets and different file formats in the NGS platforms. The course provides hands-on experience on the R and Linux platforms, which are the inevitable tools for NGS data processing. Basic principles of Transcriptome and genome sequencing, experiment design, sampling, and data processing are covered in the program which provides confidence for the student to analyze his/her dataset in the future. The course layout has adapted to the needs of beginners in the field of life science and allows students with no or little background in bioinformatics to get a first hands-on experience in this fast-evolving topic.
Justification for launching the programme proposed	Bioinformatics is a rapidly growing field with many potential applications, and there is a high demand for skilled bioinformatics professionals. The program will be suited for candidates those who have completed their Master's degree in any branch of Life Sciences. Previous knowledge of programming is not required.
Other institutes offering similar programmes	Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, Online platform like Coursera.
Expected graduate outcomes of the proposed programme	The program will provide a strong foundation in the basic principles of next generation sequencing and data analysis. Upon successful completion, the participants will be able to use bioinformatics tools and techniques to analyse big biological datasets.
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Yes, United Arab Emirates University

Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	10,000
Additional Infrastructural requirements if any needed for the proposed programme	Computer lab with at least 25 systems and buffer systems with dual boot (Windows/Linux)

CERTIFICATION COURSE – II

Name of the proposed Programme	Insilco Drug Discovery and Evaluation
Nature of the programme proposed	certification
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	3 months (1 month online and 2 month offline)
Description of the programme proposed	A brief note on the content of the programme (Max 500 words) The field of computer-aided drug discovery (CADD) has been growing steadily in recent years due to advancements in computational techniques, increased access to high-performance computing resources, and the rising demand for new and improved pharmaceuticals. This growth has created a wide range of job opportunities for individuals with expertise in CADD. Here with this certification course, we offer additional opportunity to get in depth theoretical and hands on experience in both key dry and wet lab experiments relevant in drug discovery and their evaluation. This may serve as a bridge course between masters and PhD, PhD and Postdocs by providing relevant research experiences and to get in to industry jobs and to establish start-ups.
Justification for launching the programme proposed	A note of the market viability. Mention admission criteria, target audience etc to show sufficient demand. Successful completion of this certificate course may help the students to get into industries, pharmaceutical companies, higher studies, and post-doctoral studies abroad in this field also enable them to initiate their on start-ups in drug discovery and wet lab evaluation.

	Admission Criteria: Passed MSc/MTech/PhD/Post Docs in any life Sciences, Computer Science, Pharmacy, Agriculture, Veterinary Science, or medicines with first class in Maters Degree (55% for SC/ST candidates).
Other institutes offering similar programmes	IIT Madras offers part of this course with only insilico drug discovery component without wet lab experiments for evaluation of the lead drug like molecules. Several online platforms like Arraygen, Udemy also offers very basic level courses for computer aided drug discovery without the wet lab component. As of now, no course offers exposure in both dry and wet lab procedures in drug discovery. Therefore, our certificate course has been designed to incorporate both wet and dry lab exposures to enable intense training and effective learning experience for the students to make them expertise in the field.
Expected graduate outcomes of the proposed programme	What kind of career opportunities for participants if they successfully complete the course.
Partnership with Industry if any for the proposed programme	We are looking forward for industry partnership.
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	As this certificate course needs hybrid mode of operation plus lab training in cell culture, and due to lack of space and facility, we cannot accommodate 25 students with the current facility of the department. We can provide 10 seats with the existing facility, but can be hiked to 25 or more if the university provide additional facility.
Proposed fees for the proposed programme	25, 000
Additional Infrastructural requirements if any needed for the proposed programme	Please keep it to the bare minimum Computer facility with minimum 10 systems. Access to animal cell culture facility and a lab space to conduct basic wet lab experiments.

MOOC PROGRAMME

Name of the proposed Programme	Industrial Microbiology
Nature of the programme proposed	MOOC
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	12 weeks
Description of the programme proposed	The objective of an industrial microbiology course is to provide students with a comprehensive understanding of the principles and practices of Industrial microbiology. After completion of the course, the students will be able to • Explain large-scale production of fermented food products • Explain the application of Microbes in the production of antibiotics, vitamins, and vaccines • Various aspects of Biopesticides and biofertilizers • Describe Biogas, biodiesel and fuel cells/hydrogen production
Justification for launching the programme proposed	The course will provide a strong foundation in the principles of Industrial Microbiology. The course is designed in such a way that it will enable the students to understand and apply the principles of industrial microbiology to real-world problems. Industrial microbiology is of paramount importance due to its multifaceted contributions to economic growth, technological advancement, human health, environment protection and sustainable development. Its role extends across diverse industries, making it a cornerstone of modern industrial and scientific progress. The program will be suited for candidates who have completed their Bachelor's degree in any branch of Life Sciences.
Other institutes offering similar programmes	Kerala University, MG University and Calicut University
Expected graduate outcomes of the proposed programme	The program will provide a strong foundation in the basic principles of microbiology and the latest upcoming field of industrial microbiology. Upon successful completion, the participants will be able to use various techniques for the value addition of various products and it will find a wide variety of job opportunities.
Partnership with Industry if any for the proposed programme	Modern Bread, Agrobiotech, Milma, FACT etc
Partnership with foreign universities if any for the proposed	Qatar University

programme	
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	10,000
Additional Infrastructural requirements if any needed for the proposed programme	Microbiology Lab with various basic instruments University MOOC studio.

2.5 DEPARTMENT OF CHEMICAL OCEANOGRAPHY

CERTIFICATION COURSE

Name of the proposed Programme	Instrumental Analytical Techniques
Nature of the programme proposed	New Certificate Course
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	6 Months (July – December)
Description of the programme proposed	Analytical chemistry is a crucial discipline within the field of chemistry that focuses on the identification and quantification of chemical substances, as well as the understanding of their properties and behavior. The importance of an analytical chemistry course can be highlighted in several key areas: Quality Control and Assurance, Environmental Monitoring, Research and Development and Food and Beverage Industry. This analytical chemistry course is important because it equips students with the knowledge and skills necessary to perform precise and accurate chemical analyses, which have far-reaching applications in various industries, scientific research, and everyday life. Understanding analytical chemistry is essential for those pursuing careers in chemistry, environmental science, healthcare, engineering, and many other fields.
Justification for launching the programme proposed	The launching of this cutting-edge analytical instrumentation course will addresses the growing need in various industries and academic fields. The key reason for introducing such a course are Industry Demand, Technological advancements in Research, quality assurance and quality control and Innovation, to meet safety regulations. In conclusion, launching this analytical instrumentation course is because of the increasing demand for professionals with expertise in operating and maintaining analytical instruments, the need for students, analysers and researchers to stay current with technological advancements, and the wide range of applications in various industries and scientific fields. Such a course can prepare students for rewarding careers, promote scientific innovation, and contribute to the quality and safety of products and processes in numerous industries.
Other institutes offering	The proposed course provides a strong theoretical

similar programmes	knowledge supported analytical skills using ultra-modern instruments. However, other institutions like KFRI, Coir board, spices board STIC etc. are offering short term (one to two months) training programs and they are focussing few sample analysis techniques using some instruments.
Expected graduate outcomes of the proposed programme	Trained and expertised hands for instrumental chemical analysis
Partnership with Industry if any for the proposed programme	This programme will be conducted in association with Export Inspection Agency, CIFT, Spices board, Synthite Industries etc for comprehensive coverage of analytical skills in modern instruments.
Partnership with foreign universities if any for the proposed programme	Norwegian Institute of Marine Research (IMR) Norway
Number of seats in the proposed programme (Minimum 25)	20 (Limited class room facility)
Proposed fees for the proposed programme	30000 (Thirty thousand)
Additional Infrastructural requirements if any needed for the proposed programme	The department is well equipped with the most modern instruments funded through PURSE, RUSA, KIIFB, and all are working in good condition. However, we require classroom: 1 No. (25 Student Capacity) The programme cost is mainly for the purchase of consumables and contingencies (Chemicals, Glassware, Gases etc)

2.6 COCHIN UNIVERSITY COLLEGE OF ENGINEERING KUTTANAD (CUCEK)

CERTIFICATION COURSE – I

Department proposing the programme	ME Division CUCEK
Name of the proposed Programme	Certificate course on Job-oriented training programmes like HVAC engineering, Piping engineering, Estimation engineering for B-Tech and Diploma holders.
Nature of the programme proposed	Certificate course
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	6 months/1 year
Description of the programme proposed	The certificate course can be conducted combined online and offline mode.
Justification for launching the programme proposed	Companies especially in the middle east need engineers in the above fields. Graduates undergoing a course from an authorized university may get more Job opportunity.
Other institutes offering similar programs	Private institutes
Expected graduate outcomes of the proposed programme	Graduates undergoing such a course from our university can be taught the courses effectively and the attendees may get more job opportunity.
Partnership with Industry if any for the proposed programme	Can be associated with industries
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme	40
Proposed fees for the proposed programme	Rs. 25000 per course
Additional Infrastructural requirements if any needed for the proposed programme	Shared use of available facilities

Educational Programmes envisaged to be offered by the
National Centre for Aquatic Animal Health in collaboration with
Cochin University College of Engineering Kuttanad

1. **M.Tech. Aquaculture Engineering**

2. **Definition: Aquaculture Engineering:** Development and engineering of cost-effective, user-friendly and efficient aquaculture production systems most appropriate to specific ecosystems and species concerned for sustainable fish production inclusive of maintenance of environmental health and the delicate balance of nature, and their extension and implementation.

3. **Expectations - Why M.Tech. in Aquaculture Engineering?** Defined, well-qualified technical personnels to support the installation and maintenance of aquaculture production systems are not available in the Country. This causes immense difficulties for Farmers and the aquaculture sector as a whole, and the situation attracts pseudo-experts to dominate the scene and misguide the investors. Most of the occasions these ill-qualified persons fail to troubleshoot and solve issues. An Aquaculture Engineer will fill the gap. **An M.Tech. in Aquaculture Engineering must be capable to design and executing need-based, species and location-specific aquaculture production systems with sustainability, and undertaking Research and Development programmes.**

4. **Challenges:** Putting together and blending all components of aquaculture production systems in the curriculum integrating engineering and biology with justification to the concept of inclusiveness of environment and maintenance of the delicate balance of nature during production.

5. **Prospects:** India looks forward to double aquaculture production within another five years. There is a dearth of engineering skills in the business. The same is the situation Internationally and the course envisaged here can serve globally for sustained fish production for food and nutritional security.

6. **Feeder Courses:** Aquaculture Engineering is proposed to be offered as an elective at B. Tech. (Civil, Mechanical, Electricals and Electronics) level at CUCEK along with the project on the same, and equip them to take up Aquaculture Engineering as a profession **to help aqua-farmers in implementing sustainable aquaculture production systems**, and to groom them to take up Aquaculture Engineering at M.Tech. level. A subcommittee to be constituted will frame the curricula for both the programmes.

7. **Infrastructure:** The three facilities such as a) Aquaculture Medicine Production Unit (Lakeside Campus, CUSAT) b) Aquaculture Engineering Laboratory (CUCEK - Campus) and c) Aquaculture Engineering Tools and Devices Production Unit (CUCEK - Campus) have to be in place before commencement of the programme

8. **Faculty:** Two Faculty Members at B.Tech. level and three at M.Tech. level

9. **Curriculum -** To be developed (A subcommittee will be constituted from the Coordination Committee, NaF - SAPS, for the development of curriculum.

10. **Sponsoring agencies:** Department of Biotechnology, Government of India.
    Intake will be from B.Tech. Engineering (Civil, Mechanical, Electrical and electronics) and B.FSc Fisheries with valid GATE Score

11. **Infrastructure:** The Infrastructure available at National Centre for Aquatic Animal Health has to be expanded is sufficient.

12. **Faculty:** Two additional Faculty

13. **Curriculum -** To be designed by the subcommittee.

14. **Sponsoring agencies:** Skill India Programme, Government of India
CERTIFICATION COURSE – II

Department proposing the programme	Cochin University College of Engineering Kuttanad–Division of Civil Engineering
Name of the proposed Programme	VALUE-BASED SKILL ORIENTATION TRAINING FOR ENGINEERS AND CONTRACTORS
Nature of the programme proposed	Certification
Mode of delivery of the Programme proposed	Hybrid (Online and Offline)
Duration of the programme proposed	45 hours
Description of the program proposed	The training programme titled Skill Orientation for Engineers and Contractors is a value-based comprehensive introduction program to the basics of engineering–understanding part, practice of the methodology in the field with knowledge of what to do and how to do. Participants can identify the purpose and processes of engineering theory and practice that can be adapted to their projects regardless of the type, size or complexity. They can also develop the necessary skills that will help them to facilitate execution and supervision of the projects with right understanding and right feelings. This will also help them to evaluate human beings and materials and be self-confident.
	The objectives of the programme include ☐ Understand the basic principles of engineering and design including the commercial software. ☐ Identify roles and responsibilities of engineers and contractors in executing a project. ☐ Imbibe values and ethical human conduct in dealing with people and resources. ☐ Understand and practice the existing methodologies in materializing engineering projects. ☐ Practice what they have understood through site visits and model studies. ☐ Develop skills and competence in

	working with people and materials.
Justification for launching the programme proposed	Graduate engineers and contractors step into their profession with either partial understanding of the concepts or with no understanding but with some practice. There is a need for imbibing kills and competence in assimilating the basic concepts and what is happening in the industry, particularly in line with ethical conduct. Fair means and professional ethics are largely missing in many of the practising engineers and contractors. So, there is a need for orientation and proper guidance based on human values and ethical human conduct. Coping with the industry and meeting the requirements of the latest construction methodologies another area to be focussed upon. Facing the challenges in the technical fields and overcoming hurdles via. value guided skills will also be addressed in this program. Legal aspects of contracts will also be covered in this program. The programme will be best suited for ● Young professionals and university graduates interested in a technical profession. ● Anyone who possess a basic degree and wishes to develop value-based skills to become contractors. ● Anyone working / looking for a job in the domains of civil, mechanical, electrical, electronics, information technology engineering areas.
Other institutes offering similar programmes	(value-based skill development of this kind may be a maiden attempt)
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of fresh graduates and working engineers and contractors in various industries related to construction, software, electronics, etc. It will ensure competence to be self-confident and work with people and resources based on harmony.
Partnership with Industry if any for the proposed programme	CANALPY, Various public (like, PWD, KSEB, LSGD, etc.) and private industries in engineering and technology, Institution of Engineers.

33

Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme(Minimum 25)	45
Proposed fees for the proposed programme	Rs 15000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.7 DEPARTMENT OF COMPUTER APPLICATION

PG PROGRAMME - I

PROPOSAL I- INTEGRATED MCA PROGRAMME	
Name of the proposed Programme	INTEGRATED MCA
Nature of the programme proposed	Exit at 3 years with BCA Degree
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	4 years
Description of the programme proposed	An Integrated MCA (Master of Computer Applications) programme is an academic degree programme that combines undergraduate and postgraduate studies in the field of computer applications. This programme is designed to provide students with a comprehensive education in computer science and applications, allowing them to gain in-depth knowledge and skills in various aspects of computer technology and software development. Students receive two degrees: a Bachelor's degree in Computer Applications (BCA) after completing the undergraduate phase and a Master's degree in Computer Applications (MCA) upon successful completion of the postgraduate phase. The curriculum includes practical training through internships or projects to provide students with hands-on experience in real-world software development. Graduates of Integrated MCA programmes are well-prepared for careers in various sectors of the IT industry. They can work as software developers, system analysts, database administrators, web developers, network administrators, cyber security experts, data scientists, and more. The programme equips students with both technical and analytical skills required for solving complex computing problems. **Objectives and learning outcomes** Integrated MCA programme is designed to provide students with a well-rounded education in computer applications, preparing them for a wide range of careers in the IT industry. The programme also aims to prepare young minds towards self-employment and create employment opportunities through enterprise development. It is expected that more job creators will come out and most of the graduates of this programme will start and thrive with their own start-ups launched during

	the study period. By the end of the programme, students will have knowledge and assimilation of key concepts of entrepreneurship, innovation and new venture development, Skills relevant to the generation of an idea, building a prototype and launching in the market.
	<u>**Highlights of the course**</u>
	1. The programme consists of ten semesters, with a focus on theoretical and practical foundations, as well as exposure to real projects twice during the course.
	2. Comprehensive Curriculum covering a wide range of computer science and applications courses, including programming, software development, database management, networking, and more.
	3. In-depth exploration of advanced topics in computer science, such as artificial intelligence, computer vision, cyber security, data science, digital image processing, machine learning and deep learning, and other emerging technologies.
	4. The classes will be handled by the best academic infrastructure of CUSAT and the Lab facilities in the department will be open to the students.
	5. The students earn two degrees - a Bachelor's degree upon completion of the undergraduate phase and a Master's degree upon successful conclusion of the postgraduate phase from CUSAT, one of the most reputed universities in the country.
	6. The programme uses a Continuous Evaluation System that assesses the learners over convenient and regular intervals.
	7. Prepare students for career readiness for a wide range of IT careers, including software development, system analysis, database administration, network management, and position themselves for successful careers in the IT industry.
	8. The programme also focuses on ethical and professional standards in software development and IT practices.

Justification for launching the programme proposed	The Integrated MCA programme paves the root for the evolving landscape of technology and the growing demand for skilled IT professionals. This programme addresses several critical needs in the education sector and the IT industry. Firstly, it streamlines the educational path for aspiring computer science enthusiasts, allowing them to earn both a Bachelor's and a Master's degree in a single, efficient programme. This not only saves time but also reduces the financial burden associated with pursuing two separate degrees. Secondly, the programme's comprehensive curriculum, practical exposure through real project work, and a focus on emerging technologies ensure that graduates are not only academically prepared but also job-ready in an industry that constantly seeks adaptable and skilled professionals. Moreover, as technology continues to shape various sectors of the economy, the Integrated MCA programme positions students to become catalysts for innovation and leaders in the digital age. In light of these factors, launching such a programme is a strategic response to the dynamic needs of the IT sector and the aspirations of tech-savvy students seeking a holistic and efficient educational pathway. **Target Audience** • Plus two graduates with a strong mathematics background particularly those who have a keen interest in computer science and technology. • Young students who value efficiency and want to streamline their educational journey by earning both a Bachelor's and Master's degree in a single integrated programme, thereby saving time and resources. • Students interested in pursuing research in computer science and technology, contributing to the advancement of the field through innovation and academic exploration. • Plus two graduates who aspire to build successful careers in the IT industry.
Other institutes offering similar programmes	• Harvard University • National Institute of Technology Tiruchirappalli • Vellore Institute of Technology [VIT], Vellore, Tamil Nadu •
Expected graduate outcomes of the proposed programme	• Technical Proficiency: Graduates should be well-versed in programming languages, software development, database management, network administration, and other core IT areas to enable them to design, develop, and maintain complex software systems and IT infrastructure. • Problem-Solving and Critical Thinking: Students should be capable of analyzing intricate computing issues, formulating effective solutions, and making informed decisions in various IT contexts for addressing real-world challenges in the field. • Professionalism and Ethics: Graduates should exhibit

	professionalism and adhere to ethical standards in their work as well as maintain integrity, confidentiality, and respect for privacy and security in IT practices. • Continuous Learning and Adaptability: Graduates should embrace a commitment to lifelong learning and adaptability. Graduates should be prepared to continuously update their skills, stay informed about emerging trends, and be open to acquiring new knowledge and technologies throughout their careers.
Partnership with Industry if any for the proposed programme	
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	The total number of seats will be capped at 30. Reservations are applicable as per Kerala Government norms.
Proposed fees for the proposed programme	Rs. 4000 /semester for 10 semesters (Total cost of the programme: Rs. 3.2 Lakhs)
Additional Infrastructural requirements if any needed for the proposed programme	1. Required 2 classrooms equipped with furniture, projectors and whiteboards.

PG PROGRAMME – II

Name of the proposed Programme	M.Tech Programme in Cyber Security for Working Professionals
Nature of the programme proposed	3 years of postgraduate study
Mode of delivery of the programme proposed	Online/ Hybrid
Duration of the programme proposed	3 years
Description of the programme proposed	Cyber Security for Working Professionals is a specialized MTech programme designed to meet the growing demand for skilled cyber security experts in today's digital world. The programme is designed for individuals who are already employed or have professional commitments, this programme offers a flexible and convenient way to gain advanced knowledge and expertise in cyber security while continuing to work. The programme emphasizes a combination of theoretical knowledge and practical skills necessary to protect organizations and individuals from cyber threats and attacks. The programme offers a dynamic blend of learning

	modalities, including live online classes, hands-on assignments and case studies, ongoing online assessments, access to virtual labs, and weekend-based offline end-semester examinations.
	Objectives and learning outcomes
	The objective of the MTech programme in Cyber Security with a focus on Work Integrated Learning is to bridge the gap between academic knowledge and practical skills in the field of cyber security. This programme aims to equip students with a deep understanding of cyber threats, vulnerabilities, and risk management strategies. By integrating academic coursework with practical, on-the-job learning, the programme seeks to produce cyber security professionals who are not only well-versed in theoretical concepts but also adept at applying their knowledge to real-world scenarios.
	Highlights of the course
	1. The programme consists of six semesters, with a focus on theoretical and practical foundations, as well as exposure to real projects.
	2. The programme includes essential cyber security skills, such as ethical hacking, digital forensics, network security, and risk management, ensuring that graduates are well-prepared to protect organizations from cyber threats.
	3. The classes will be handled by the best academic infrastructure of CUSAT and the Lab facilities in the department will be open to the learning professionals.
	4. The programme uses a continuous evaluation system that assesses the learners over convenient and regular intervals.
	5. The programme offers students a competitive edge in the job market, as they graduate with both academic qualifications and practical experience. This positions them for career advancement, leadership roles, and specialized cyber security positions.
Justification for launching the programme proposed	The M.Tech programme in Cyber Security stems from the critical need to address the escalating cyber threats and vulnerabilities that organizations and individuals face in our digital world. Cyber security has become a top priority for governments, businesses, and individuals, as cyber-attacks continue to grow in scale and sophistication. The programme also aims to strengthen the cyber security workforce by providing organizations with highly skilled professionals who can contribute immediately to securing digital infrastructures. In an era where cyber security breaches, launching a work integrated learning programme in Cyber Security is a strategic response to the urgent need

	for a well-prepared and agile cyber security workforce to protect our digital future. **Target Audience** - Working professional with B.Tech./B.E. or MCA or M.Sc./MS degree in S/IT/Mathematics/Physics/Statistics. - Employees having one year of experience and wish to upskill their knowledge. - Graduates interested in pursuing research in cyber security, contributing to the advancement of the field through innovation and academic exploration. - Individuals passionate about cyber security as a hobby or side interest who want to formalize their knowledge and skills, and potentially transition into a cyber-security career.
Other institutes offering similar programmes	- BITS Pilani - IIT Kanpur - IIIT Kottayam
Expected graduate outcomes of the proposed programme	- Technical Expertise: Graduates should have a deep understanding of cyber security principles, technologies, and best practices, including knowledge of network security, cryptography, ethical hacking, threat detection, and incident response. - Critical Thinking: Graduates should possess strong analytical and problem-solving skills, enabling them to identify vulnerabilities, assess risks, and develop innovative security solutions. - Professionalism and Ethics: Graduates should have a solid understanding of ethical and legal considerations in cyber security.
Partnership with Industry if any for the proposed programme	Required
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	The total number of seats will be capped at 20. Reservations are applicable as per Kerala Government norms.
Proposed fees for the proposed programme	Rs. 6000 /semester for 6 semesters (Total cost of the programme: Rs. 3.6 Lakhs)
Additional Infrastructural requirements if any needed for the proposed programme	1. Platforms and Virtual labs for managing online sessions

CERTIFICATION COURSE - I

Name of the proposed Programme	Full Stack Developer
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	75 hours [5 weeks with 15 Hrs per week]
Description of the programme proposed	This certification course on Full Stack Developer covers all the latest technologies and frameworks that the participant needs to know to build today's modern websites. Starting from frontend development, the participants will slowly progress to other aspects of development including backend, database, debugging, version control and other essential technologies. The participants will acquire the skills and knowledge needed to design, develop, and deploy full-fledged web applications. **The objectives of the programme include** - Master the most up-to-date practical skills and tools that full stack developers use in their daily roles. - Develop software with front-end development languages and tools such as HTML, CSS, JavaScript, React, and Bootstrap. - Learn how to deploy and scale applications using Cloud Native methodologies and tools such as Containers, Kubernetes, Micro services, and Server less. - Learn to deploy a complete application by integrating Angular, Node.js, Express.js and MongoDB.
Justification for launching the programme proposed	Many organizations seek professionals who can handle both frontend and backend development, making full stack development skills highly valuable. As full stack developers possess a versatile skill set that allows them to work on end-to-end web application development, they are adaptable to various projects and roles within the industry. This certification course is best suited for - Individuals who want to become Full Stack Web Developers. - Frontend or backend developers looking to expand their skill set to encompass both aspects of web development. - Entrepreneurs or startup founders aiming to build and launch their own web applications
Other institutes offering similar programmes	IIT Roorkee, Online courses in Coursera and Udemy
Expected graduate outcomes of the proposed programme	This course equips individuals with a comprehensive skill set that helps them to design, develop, and deploy web applications from both frontend and backend perspectives. The graduates of this program will excel in web developer role, contribute to the creation of web applications, and navigate the complex challenges of the web development

	industry.
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	40
Proposed fees for the proposed programme	Rs. 20000 per student
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERTIFICATION COURSE - II

Name of the proposed Programme	Data Analytics with Python
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	60 hours [4 weeks with 15 Hrs per week]
Description of the programme proposed	This certification course on Data Analytics with Python is designed to equip individuals with a comprehensive introduction to data analytics, with a strong focus on using Python as the primary tool for data exploration, analysis, and visualization. Participants will learn essential data analysis techniques and gain hands-on experience in using Python libraries such as NumPy, pandas, Matplotlib, and Seaborn to manipulate and visualize data effectively. The course also covers statistical analysis, data cleaning, and data pre-processing techniques. **The objectives of the programme include** ● Develop Python code for cleaning and preparing data for analysis - including handling missing values, formatting, normalizing, and binning data. ● Manipulate data using data frames, summarize data, understand data distribution, perform correlation and

	create data pipelines.
	• Perform exploratory data analysis and apply analytical techniques to real-world datasets using libraries such as Pandas, Numpy and Scipy. • Participants will get insight into creating informative and visually appealing data visualizations using libraries like Matplotlib and Seaborn.
Justification for launching the programme proposed	Nowadays, data analytics is crucial for organizations to make data-driven decisions, optimize processes, and gain a competitive edge. As businesses across various sectors rely on data to make informed decisions, there is a strong demand for individuals skilled in data analytics. Moreover, understanding data analytics serve as a foundation for learners interested in pursuing further studies or research in data science, analytics, or related fields. This certification course is best suited for • Young professionals and university graduates seeking to enter the field of data analytics. • Business analysts, researchers, and professionals in various industries who need data-driven insights for decision-making.
Other institutes offering similar programmes	IIT Roorkee, IIT Kharagpur, IIT Chennai, IIT Kanpur, IIIT Bangalore, IIM Amritsar, Online courses in Coursera and Udemy
Expected graduate outcomes of the proposed programme	This course equips individuals with a range of skills and attributes that prepare them to effectively analyze data, draw insights, and make data-driven decisions using Python. These skills are highly relevant in a wide range of industries and roles that rely on data for decision-making.
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	40
Proposed fees for the proposed programme	Rs. 20000 per student
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERTIFICATION COURSE - III

Name of the proposed Programme	Machine Learning Operations (MLOps)
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	60 hours [4 weeks with 15 Hrs per week]
Description of the programme proposed	This certification course on Machine Learning Operations (MLOps) is designed to help participants who want to understand the lifecycle of a Machine Learning model from experimentation to production. The best practices and recommended ways to put machine learning models into production will be covered in this course. The participants will thus get knowledge on how to use the power of MLOps to build scalable and repeatable ML pipelines. **The objectives of the programme include** • Understand the lifecycle of a Machine Learning model • Leverage the power of MLOps to productionalise Machine Learning models. • Gain the best practices for putting Machine Learning models in production. • Get some insights on how to choose your perfect MLOps stack.
Justification for launching the programme proposed	Many organizations across various sectors are adopting machine learning and hence MLOps expertise is crucial for deploying and maintaining ML models at scale. MLOps expertise ensures the successful deployment, monitoring, and maintenance of machine learning models in production environments. It addresses key challenges related to scalability, reliability, security, compliance, cost efficiency, and cross-functional collaboration, ultimately enabling organizations to leverage the full potential of machine learning for data-driven decision-making. Thus, this certification course is best suited for • Young professionals and university graduates who want to specialize in MLOps as part of their academic and career development. • Individuals from diverse backgrounds who are interested in entering the field of machine learning and want a structured path to acquire MLOps skills
Other institutes offering similar programmes	IIT Roorkee, Online courses in Coursera and Udemy
Expected graduate outcomes of the	Through this course the participant will learn technical, operational, and interpersonal skills necessary to excel in

proposed programme	MLOps roles. It prepares graduates to adapt to the evolving landscape of machine learning and contribute effectively to organizations that leverage machine learning for data-driven decision-making
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	40
Proposed fees for the proposed programme	Rs. 20000 per student
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.8 DEPARTMENT OF COMPUTER SCIENCE

PG PROGRAMME

Name of the proposed Programme	M. Tech Computer Science and Engineering (Data Science and Artificial Intelligence) (Part-Time)
Nature of the programme proposed	Modification of existing programme.
Mode of delivery of the programme proposed	Hybrid (Theory Classes online. Practical Classes and Internal/External Exams offline)
Duration of the programme proposed	3 years (6 semesters)
Description of the programme proposed	The M.Tech. Computer Science and Engineering (Artificial Intelligence and Data Science) (Part-Time) programme is designed to equip computer engineers with the skills and knowledge needed to excel in the fields of Artificial Intelligence and Data Science. Graduates of this program are expected to take on leadership roles in software design and development teams, demonstrating proficiency in modelling, designing, testing, and decision-making within the context of AI and Data Science projects. The curriculum places equal emphasis on computational expertise and managerial competencies to prepare students for success in these dynamic and data-driven domains.
Justification for launching the programme proposed	- Industry Demand: Growing need for AI and Data Science professionals across various sectors. - Technological Advancements: Rapid developments in AI and Data Science. - Research Opportunities: Contribution to advancing knowledge in these fields. - Skill Development: Equips students with valuable, transferable skills. - Leadership and Management: Focus on leadership and managerial skills. - Economic Impact: Potential to drive innovation and economic growth. - Global Competitiveness: Attracts international students and faculty. - Interdisciplinary Nature: Promotes collaboration across disciplines. - Addressing Societal Challenges: Can provide innovative solutions to critical challenges
Other institutes offering similar programmes	BITS, AMRITA, SRM, IIIT Kottayam
Expected graduate	For fresh graduates, this M.Tech. programme offers an

outcomes of the proposed programme	exceptional opportunity to kickstart a promising career in the dynamic fields of AI and Data Science, with excellent prospects in industries such as software development, electronics, and construction. For industry professionals seeking to up skill and advance their careers, this program provides an invaluable avenue to acquire cutting-edge competencies in AI and Data Science, enhancing their expertise and opening doors to leadership roles and new opportunities within their respective sectors. For research enthusiasts, this program offers a rich academic environment conducive to exploration and innovation in AI and Data Science. Graduates can contribute to ground breaking research and developments in these fields, making a meaningful impact on the future of technology
Partnership with Industry if any for the proposed programme	Litmus 7 (in Discussion)
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	3.25 Lakhs (INR)
Additional Infrastructural requirements if any needed for the proposed programme	Computing Lab with 30 Workstations

CERTIFICATION COURSE - I

Department proposing the programme	Department of Computer Science
Name of the proposed Programme	Post Graduate Diploma in Machine Learning and Data Analytics
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid
Duration of the	1 Year (2 semesters)

programme proposed	
Description of the programme proposed	The PG Diploma in Machine Learning and Data Analytics is designed to prepare graduates to excel as professionals in the field of data science and machine learning. Graduates will be equipped to manage complex data analytics projects, lead teams in designing and developing machine learning solutions, and possess strong capabilities in data modelling, testing, and decision-making. The program emphasizes both computational and managerial skills throughout the course curriculum
Justification for launching the programme proposed	The PG Diploma in Machine Learning and Data Analytics is a highly justified and valuable program in response to the soaring industry demand for professionals adept in data science. In an era where data is the lifeblood of businesses, this course equips graduates to thrive in roles such as Data Scientist, Machine Learning Engineer, and Data Analyst. With a shortage of skilled data professionals in the job market, graduates are well-positioned for rewarding careers across diverse industries, contributing to business competitiveness and innovation in a globally relevant field. This program's unique blend of computational and managerial skills makes it a versatile choice, preparing graduates to excel in both technical and leadership roles.
Other institutes offering similar programmes	Kannur University, IIIT Bombay, BITs
Expected graduate outcomes of the proposed programme	Graduates of the PG Diploma in Machine Learning and Data Analytics can look forward to a wealth of career opportunities in today's data-driven world. With expertise in machine learning and data analytics, they are well-suited for roles such as Data Scientist, Machine Learning Engineer, Business Analyst, and Data Analyst. These professionals play pivotal roles in industries ranging from finance and healthcare to e-commerce and technology, where their skills in extracting insights from data and making data-driven decisions are in high demand. With the ability to tackle complex data challenges and lead analytics teams, graduates are well-positioned to thrive in a variety of rewarding and high-paying careers
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the	35

proposed programme (Minimum 25)	
Proposed fees for the proposed programme	Rs. 48000/- (INR)
Additional Infrastructural requirements if any needed for the proposed programme	Computing Lab with 35 Workstations

CERTIFICATION COURSE – II

Name of the proposed Programme	Post Graduate Diploma in Application Software Development
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	1 Year (2 semesters)
Description of the programme proposed	The PG Diploma in Application Software Development is a comprehensive and rigorous program that equips graduates with the skills and knowledge required to excel in the competitive field of software development. With expertise in web and mobile development, backend programming, cloud computing, DevOps practices, database management, security, and project management, graduates are well-prepared to embark on successful careers as software developers and engineers, contributing to the ever-evolving world of technology. This program provides a solid foundation for students to adapt to emerging technologies and drive innovation in the digital realm.
Justification for launching the programme proposed	Starting a one-year Postgraduate Diploma in Application Software Development is a strategic decision driven by the increasing demand for skilled software developers in today's technology-driven world. This program offers a unique opportunity to acquire comprehensive knowledge and hands-on experience in a wide array of critical areas, including web and mobile development, backend programming, cloud computing, and DevOps practices. In a constantly evolving digital landscape, this program equips individuals with the essential skills and expertise needed to thrive in the competitive tech industry. It not only opens doors to a multitude of career opportunities but also enables graduates to contribute to innovation and transformation across various sectors. By enrolling in this program, I am making an investment in my future, positioning myself to be at the forefront of software development and technology advancements, and

	ultimately, contributing to the creation of innovative and impactful solutions in our digital world.
Other institutes offering similar programmes	Digital University, CDAC, IIIT Bombay,
Expected graduate outcomes of the proposed programme	Completing a one-year Postgraduate Diploma in Application Software Development with a focus on web, mobile, backend, cloud, and DevOps opens up a diverse range of career opportunities. Graduates can pursue roles as software developers, mobile app developers, backend engineers, cloud specialists, DevOps engineers, database administrators, quality assurance analysts, and more. This diploma equips individuals with the skills needed to excel in the technology industry and adapt to the ever-evolving landscape, making it a valuable investment in expanding career prospects.
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	35
Proposed fees for the proposed programme	Rs. 48000/- (INR)
Additional Infrastructural requirements if any needed for the proposed programme	Computing Lab with 35 Workstations

2.9 DEEN DAYAL UPADYAY KAUSHAL KENDRA (DDUKK)

PG PROGRAMME

Name of the proposed Programme	Integrated M.Voc Programme (leading to B.Voc Business Process & Data Analytics and M.Voc in Business Analytics)
Nature of the programme proposed	New degree/modification of existing
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	3 + 2years (B.Voc - M.Voc)
Description of the programme proposed	DDUKK is currently offering a B.Voc programme in Business Process and Data analytics and it is very popular programme. We are able to generate over 1500 applications for the 30 seats of the B.Voc programme and the programme has an excellent placement record too. The proposed integrated MVoc programme in Business Analytics is an initiative to transform the existing B.Voc programme to a five year integrated B.Voc- M.voc programme with multiple entry and exit options in the emerging educational scenario in the backdrop of NEP 2020.

The field of business analytics is growing rapidly as Digitalization of businesses has taken off in a big way across all industry domains. Exponential growth in data, adoption of cloud computing across firms and the resulting pressure on the firms to organize, manage, and leverage data for better business decisions are the key drivers of this growth. This offers excellent career opportunities for people with the right skills and expertise in the field of business analytics. However, the present supply of talent is way below the present demand in India and abroad with more than 41 % gap as reported in the Survey 2022.

Distinct from the traditional degree programs, the B.Voc /M.Voc programs |

have defined exits ranging from Diploma to Master's degree within the program duration. Such flexibility is also associated with corresponding job roles in accordance with the NSQF. Certification by the corresponding Skill Sector Council will ensure wider acceptance by industry. On completion of the PG level, graduates can be Data Analysts or Data Scientists oriented towards business process in multiple domains. As vocational courses stress entrepreneurial outcomes, graduates will be equipped to start own ventures in the data analytics arena.

Objectives and learning outcomes

The program is intended to prepare students completing senior secondary school to move into a defined career path in data analytics. Courses in the program and the internship components provide the students a realistic assessment of the skill sets to develop employability as well as benchmark themselves. Being vocational course, self-employment and employment generation opportunities through start-ups in the domain are also available career options.

By the end of the program, students will have knowledge and assimilated

- Concepts of organizations and management
- Key concepts of business process modelling and analysis
- Domain-specific skills in the application of analytical tools using ML and statistical decision-making
- Specificskillsetsinselectedspecializ ationareaslikefinancial/securities /marketing/ consumer analytics
- The basic knowledge for entrepreneurial innovations in the specific area of interest

Highlights of the course

1. The program has ten semesters, with both theory and applications getting almost equal weight throughout the program.
2. The students earn Both B.Voc and M. Voc degrees from CUSAT, one of the most reputed universities in the

52

	country.
	3. The students are trained on the industry skill sets through a curriculum involving multiple internships and flexible evaluation incorporating workshops in identified domains.
	4. Students have the opportunity to join as incubates in the CUSAT-TBI.
	5. The academic infrastructure of CUSAT and the extended facilities of organizations offering them and mandatory internships are available for students.
	6. The midcourse full semester internship and the final semester internships are unique to this course.
	7. The courses will be taught by faculty with industry experience and real-world exposure to the field of study.
	8. A continuous evaluation system in accordance with OBE will be followed for the program.
Justification for launching the programme proposed	DDUKK currently offers B. Voc (Business Process and Data Analytics) with the following highlights: - Good demand ratio for the programme (around 1800 application last year) - Acceptance by industry as shown by placements and acceptance of former students in data science/analytics higher degree programs including institutions in India and abroad. - Unique combination of business analytics and business management / process subjects along with data science courses like Machine Learning and Predictive Analytics. PG program of M Voc (Business Analytics) will be a logical extension of the B.Voc (BPDA)program as - It offers students completing B.Voc (BPDA) options for higher studies in the same stream - Another important thing is, there

	are large number of B.Voc programmes offered in various colleges in the state in technology and management related domain. Students graduating from these programmes can take lateral entry to this integrated programme during the fourth year.
	-
	It is aligned to industry demand for trained manpower with higher level skill sets in Data Analytics covering advanced statistical packages and programming. In March 2022 report by Deloitte, it is mentioned that "the number of jobs posted by tech companies for analysis skills—including machine learning (ML), data science, data engineering, and visualization—surpassed traditional skills such as engineering, customer support, marketing and PR, and administration Industry demand for highly skilled Data Analytics professionals".
	Input requirements
	In keeping with the Flexible Entry pattern there will be two direct entry levels to the program.
	1. The program will be open to applicants who have completed their Senior secondary school with Mathematics or Statistics as one of their subjects and has passed the examinations with not less than 65% in total. These applicants will need to start at the first semester of the program.
	2. The second direct entry option is at the seventh semester which will be open to graduates who have completed a relevant degree including B.Sc Computer Science, BCA, BBA or B Voc in an associated area with mathematics / statistics /computer programming as one of the subjects of study in the program. Engineering graduates in any discipline will also be considered. The open seats for admission at this stage will be

	limited by the current enrollment in the integrated course. But provisions shall be made for lateral entry during fourth year.
Other institutes offering similar programmes	Currently no institute/university is offering an Integrated M.Voc programme.
Expected graduate out comes of the proposed programme	Each year of the programme will have specific job roles aligned with NSQF. Graduates can take up the jobs of Data Scientists and the one who finish the M.Voc can even take up the role of a business analyst.
Partnership with Industry if any for the proposed programme	Data analytics electives in the financial domain in collaboration with M/S Geojit Financial Services Ltd. Machine Learning and Predictive/Text analytics supplementary skill courses in association with M/S. Tata Consultancy Services.
Partnership with foreign universities if any for the proposed programme	Nil Efforts are initiated
Number of seats in the proposed programme (Minimum 25)	30 regular plus 10 lateral entry
Proposed fees for the proposed programme	Rs.30,000 for all semesters excluding internship semesters. Rs.20,000 for internship semesters - six and ten. The total fees will be Rs.2,80,000/-
Additional Infrastructural requirements if any needed for the proposed programme	The classroom facilities at DDUKK will be enough to start the program but an additional computer laboratory with 40 computers will be required to fully meet student's needs.

CERTIFICATION COURSE – I

Name of the proposed Programme	Certificate programme on iOS Application Development
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	50 hours (30+20)

| Description of the programme proposed | The Certificate in iOS Application Development is an all-encompassing and hands on programme meticulously crafted to equip individuals for a thriving career in mobile app development. This *program caters to individuals with ambitions* of becoming skilled iOS app developers or those looking to elevate their current development competencies. Centered on the Swift programming language and the iOS platform, participants will acquire the expertise and hands-on practice required to craft top-notch iOS applications that are intuitive, of exceptional quality, and showcase Innovation.

Program Highlights:

- Fundamentals of iOS Development: The program begins with a strong foundation in iOS development, covering Swift syntax, Xcode, and SwiftUI.
- Hands-on Projects: Practical experience is key. Participants will work on a series of real-world projects, from creating simple apps to building complex applications.
- Industry Best Practices: Learn industry-standard practices for code quality, testing, and app deployment to ensure your apps meet professional standards.
- Flexible Learning: The program is designed to accommodate full-time students, working professionals, and career changers.
- Certification: Upon successful completion, participants will receive a Certificate in iOS Application Development.

The objectives of the programme include

- Develop proficiency in iOS application development using the Swift programming language.
- Create user-friendly and feature-rich mobile applications for iOS platforms. |
|---|---|

	- Ensure adherence to industry best practices and coding standards. - Equip participants with the skills and knowledge to design, develop, and deploy iOS applications. - Prepare participants for a successful career in iOS app development. - Provide hands-on experience and practical application of Swift in real-world projects. - Foster the ability to create high-quality iOS applications that meet user expectations. - Stay updated with the latest iOS and Swift Developments to remain competitive in the field.
Justification for launching the programme proposed	1. High Demand for iOS Developers: The mobile app industry, particularly on the iOS platform, continues to experience significant growth. There is a constant need for skilled iOS app developers to create innovative and user-friendly applications. Launching this program addresses the growing demand for talent in this sector. 2. Swift as the Preferred Language: Swift has established itself as the primary programming language for iOS app development. Its simplicity, speed, and safety features make it an ideal choice. By offering a program focused on Swift, we align with industry trends and equip participants with a highly marketable skill. 3. Skill Shortage: Despite the increasing demand for iOS app developers, there is a shortage of qualified professionals in this field. Many organizations struggle to find developers with the right expertise. This program will help bridge this skill gap by producing capable and job-ready iOS developers. 4. Career Opportunities: iOS app development offers promising career prospects. Our program not only imparts technical skills but also provides career development support,

	including resume building and interview preparation, to ensure participants are well-prepared for their professional journey.
	5. Innovation and Entrepreneurship: The iOS platform is a hotbed for innovation and entrepreneurship. By providing individuals with the skills to create iOS apps, we empower them to bring their ideas to life, foster innovation, and potentially launch their start-ups.
	6. Economic Impact: A well-trained iOS developer can contribute significantly to the digital economy. By nurturing talent in this field, we are not only empowering individuals but also making a positive contribution to the local and global economy.
	7. Flexibility and Accessibility: Our program is designed to be flexible, accommodating a wide range of learners, from full-time students working professionals seeking a career change. This accessibility ensures that individuals from diverse backgrounds can benefit from this opportunity.
	8. Industry Collaboration: We plan to collaborate with industry experts and organizations to provide real-world insights, guest lectures, and potential internship opportunities. This ensures that our program remains aligned with industry needs and trends.
	Launching the Certificate Program in iOS Application Development is a strategic response to the growing demand for iOS app developers, aligns with industry trends, and empowers individuals with valuable skills and career prospects. It represents a significant opportunity to make a positive impact on both individuals and the broader economy. The programme will be best suited for ● Young Professionals and university graduates interested in a development career. ● Any one who wants to develop or enhance their mobile application development knowledge and skills.

Other institutes offering similar programmes	Online courses in Coursera and Udemy
Expected graduate outcomes of the proposed programme	Upon successful completion of the Certificate Program in iOS Application Development, participants will: ● Proficiency in Swift: Attain a high level of proficiency in the Swift programming language, enabling the creation of iOS applications. ● Effective iOS App Development: Develop the skills to design, build, and deploy iOS applications that adhere to industry standards and user-centric design principles. ● Problem-Solving Abilities: Cultivate strong problem-solving skills to troubleshoot technical challenges in iOS app development, ensuring the ability to create reliable and innovative mobile applications. ● Job Readiness: Be well-prepared for a career in iOS app development, equipped with a professional portfolio and an understanding of industry practices and trends.
Partnership with Industry if any for the proposed programme	Proposed to have tie up with TCS, UST, FINGENT etc.
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme	15 (Minimum 10)
Proposed fees for the proposed programme	Rs 10,000/-plus GST
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERTIFICATION COURSE – II

Name of the proposed Programme	Certificate programme on Employability Enhancement
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid

Duration of the programme proposed	30 hrs
Description of the programme proposed	The Certificate Program on Employability Enhancement is a comprehensive and skill-focused initiative designed to prepare individuals, particularly students and recent graduates, for success in the competitive job market. This program aims to equip participants with the essential skills, knowledge, and attitudes required to enhance their employability and secure fulfilling employment opportunities.

Highlights of the course

1. **Skill Development:** The program focuses on developing a wide range of practical and soft skills that are highly sought after by employers, including communication, problem-solving, teamwork, and adaptability.

2. **Career Readiness:** Participants will gain insights into the job search process, including resume writing, interview preparation, and networking skills, to effectively navigate the recruitment landscape.

3. **Industry-Relevant Training**: The programme offers specialized modules and workshops tailored to specific industries, ensuring that participants are well-prepared for the demands of their chosen career paths.

4. **Self-Awareness**: Through self-assessment tools and workshops, participants will gain a better understanding of their strengths, weaknesses and career aspirations, enabling them to make informed decisions about their professional journey.

5. **Networking and Mentorship**:

	Opportunities for networking with industry professionals and access to mentorship programs will be provided to connect participants with experienced professionals who can guide them in their career development. 6. **Certification**: Upon successful completion of the program, participants will receive a certificate, demonstrating their commitment to personal and professional growth. **Who Should Attend:** ● College students nearing graduation ● Recent graduates seeking their first job. ● Individuals looking to transition into anew career. ● Jobseekers wanting to enhance their employability. **Delivery Format:** The program can be offered through a combination of in-person classes, online modules, workshops, and interactive webinars to accommodate different learning preferences and schedules. **Assessment and Certification:** Participants will be assessed through quizzes, assignments, and a final project or examination. Successful completion of the program will lead to a Certificate of Employability Enhancement. **Benefits of the Program:** ● Improved job prospects. ● Enhanced career readiness. ● Skill development for personal and professional growth.

	- Access to industry-specific knowledge. - Networking opportunities. - Increased self-awareness The program is typically conducted over a duration of one week and is divided into modules that cover the following key areas: 1. **Fundamental Skills:** Communication, critical thinking, problem-solving, and time management. 2. **Aptitude Training:** Specialized modules will be dedicated to enhancing participants' aptitude in areas such as quantitative reasoning, logical thinking, and data interpretation, which are crucial for success in various professions. 3. **Industry-Specific Training:** Participants can choose from a variety of industry-focused tracks, such as IT(Android/iOs, Analytics, Consulting, and entrepreneurship, to gain specialized knowledge and skills. 4. **Career Development:** Resume building, interview preparation, job search strategies, and personal branding. 5. **Soft Skills Enhancement:** Team work, leadership, emotional intelligence, and adaptability. 6. **Personal Growth:** Self-assessment, goal setting, and building a growth mind-set.

Justification for launching the programme proposed	1. **Addressing a Pressing Need:** India has been facing a significant employability gap, with a large number of graduates lacking the necessary skills and readiness for the job market. DDUKK's program can directly address this pressing issue by equipping students with the skills and knowledge needed for successful employment.
	2. **Holistic Skill Development:** The program can provide a holistic education by focusing on not only technical skills but also soft skills, aptitude training, and career readiness. This comprehensive approach ensures that graduates are well-prepared for various job roles and can adapt to different work environments.
	3. **Competitive Advantage:** DDUKK can gain a competitive advantage by offering a unique program that emphasizes employability. Graduates with strong employability skills are more likely to secure jobs and perform well in their careers, enhancing the reputation of the institution.
	4. **Industry Relevance:** By tailoring the program to specific industries, DDUKK can ensure that graduates are well-aligned with the needs of the job market. Industry-specific training enhances the employability of students in sectors where they intend to work.
	5. **Career Development:** The program's emphasis on career development, including resume building, interview preparation, and networking, ensures that students are not only job-ready but

	also capable of advancing in their careers over time.
	6. **Meeting Industry Expectations:** Employers today expect more than just technical skills; they want employees who can communicate effectively, work in teams, and adapt to changing environments. DDUKK's program aligns with these industry expectations.
	7. **Supporting Economic Growth:** Enhancing the employability of graduates contributes to the overall economic growth of the region and the country by ensuring a skilled and productive workforce.
	8. **Demonstrating Social Responsibility:** DDUKK's initiative reflects a commitment to social responsibility by helping reduce unemployment and underemployment in the region and fostering economic empowerment.
	In summary, DDUKK's decision to offer a Certificate Program on Employability Enhancement is justified due to the pressing need to bridge the employability gap in India, complement existing courses, and provide holistic skill development. This initiative can not only benefit individual students but also contribute to the institution's competitiveness and the socioeconomic development of the region.
Other institutes offering similar programmes	IIMT UNIVESRITY, MEERUT
Expected graduate outcomes of the proposed programme	- Enhanced Soft Skills - Aptitude and Critical Thinking - Industry-Specific Competence - Effective Communication - Career Readiness - Self-Awareness - Networking skills - Increased Confidence - Continuous Learning attitude

	- Experiential Learning attitude - Contribution to Employers
Partnership with Industry if any for the proposed programme	Collaboration is proposed with Tata Consultancy Services, IBM and Kerala Startup Mission.
Partnership with foreign universities if any for the proposed programme	Nil Efforts are initiated
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	Rs. 7500 + GST
Additional Infrastructural requirements if any needed for the proposed programme	A training hall with sufficient space for 40 participants and supported with ICT facilities

2.10 DEPARTMENT OF ELECTRONICS

PG PROGRAMME – I

Department proposing the programme	Electronics
Name of the proposed Programme	Integrated MTech Program in Electronics System Design (with specialization VLSI & Embedded systems, Microwave and Radar Engineering, Robotics and Intelligent Systems)
Nature of the programme proposed	Integrated MTech Degree (multiple exit – BTech/MTech) BTech in Electronics System Design Integrated MTech in VLSI & Embedded systems Integrated MTech in Microwave and Radar Engineering Integrated MTech in Robotics and Intelligent Systems BTech honours in any of the above specializations
Mode of delivery of the programme proposed	Offline/Hybrid
Duration of the programme proposed	5 years
Description of the programme proposed	An Integrated MTech Program in Electronics System Design, with specializations in VLSI & Embedded Systems and Microwave and Radar Engineering, is a comprehensive academic endeavor designed to equip students with advanced knowledge and practical skills in the field of electronics and systems design. This program typically spans a duration of 5 years and combines undergraduate and postgraduate studies into a single integrated curriculum. Below, we provide a concise overview of the core components and contents of such a program: **Foundation Courses:** The program begins with foundational courses in mathematics, physics, and basic electronics. These courses establish a strong academic base and ensure that all students have a solid understanding of fundamental principles. **Core Electronics Subjects:** Students delve into core electronics subjects, including analog and digital electronics, circuit analysis, and electromagnetic theory. These subjects form the basis for

	advanced studies and specialization.
	Computer Programming: To prepare students for embedded systems and VLSI design, programming courses in languages like C/C++ and assembly language are typically included. **Advanced Electronics and VLSI Design:** As students progress, they study advanced topics in electronics, such as semiconductor devices, integrated circuits, and VLSI design methodologies. This prepares them for the specialization in VLSI and Embedded Systems. **Embedded Systems:** Specialized courses focus on embedded system design, microcontroller programming, real-time operating systems, and interfacing with hardware devices. Students gain hands-on experience in designing and programming embedded systems for various applications. **Microwave Engineering:** For the Microwave and Radar Engineering specialization, coursework includes microwave components, waveguides, transmission lines, and microwave circuit design. Students learn the theory and practical aspects of high-frequency systems. **Radar Engineering:** Advanced studies in radar systems encompass radar signal processing, antenna design, radar system architecture, and radar system simulation. This specialization equips students to work on radar systems for defense, aviation, and remote sensing applications. **Digital Signal Processing (DSP):** DSP courses cover techniques for processing and analyzing digital signals, essential for both VLSI design and radar signal processing. **Communication Systems:** Students explore communication theory, modulation techniques, and wireless communication systems, which are relevant to both specializations. **Elective Courses:** The program typically offers a range of elective courses, allowing students to tailor their education further to their interests. Electives may include topics like artificial intelligence, IoT, EMI EMC, VLSI Testing etc. **Projects and Laboratories:** Throughout the program, students engage in hands-on projects and experiments in well-equipped laboratories. These practical experiences reinforce theoretical knowledge and encourage innovation. **Internship and Industry Exposure:**

	Many integrated MTech programs incorporate internships or industry exposure, enabling students to apply their skills in real-world settings and build valuable industry connections. **Thesis and Research:** In the final year, students undertake a research project and write a thesis related to their chosen specialization. This capstone project demonstrates their ability to conduct independent research and contribute to the field. **Seminars and Workshops:** Students often participate in seminars, workshops, and conferences to stay updated with industry trends and emerging technologies. Upon successful completion of the program, graduates are well-prepared for careers in industries such as semiconductor design, embedded systems development, radar and microwave engineering, research and development, and academia. This integrated MTech program combines a strong academic foundation with hands-on experience and specialized knowledge, making it an attractive choice for those interested in the dynamic field of electronics system design.
Justification for launching the programme proposed	The market viability of an Integrated MTech Program in Electronics System Design, featuring specializations in VLSI & Embedded Systems, Microwave, and Radar Engineering, is robust and promising. In today's tech-driven world, the demand for professionals skilled in these areas is continually on the rise. Industries such as semiconductors, telecommunications, defense, and electronics rely heavily on experts in these domains for innovation and development. A well-designed curriculum, access to cutting-edge technologies, strong faculty expertise, and industry collaborations can make this program highly attractive to both students and employers. This will help attract good students right after high school.
Other institutes offering similar programmes	IITM, NIELIT, IIIT Bangalore
Expected graduate outcomes of the proposed programme	Graduates who successfully complete an Integrated MTech Program in Electronics System Design with specializations in VLSI & Embedded Systems and Microwave and Radar Engineering can look forward to a wide range of exciting and rewarding career opportunities across various sectors. Here are some of the career paths that may be available to them: VLSI Design Engineer: VLSI design engineers are responsible for designing and developing integrated circuits (ICs) and semiconductor

devices. They work on projects related to microprocessors, memory chips, and other semiconductor components. Graduates with a VLSI specialization can find employment in semiconductor companies and electronic product design firms.

Embedded Systems Developer:

Embedded systems developers design and program embedded systems for various applications, including consumer electronics, automotive, medical devices, and industrial automation. They work on projects involving microcontrollers, sensors, and real-time operating systems.

ASIC (Application-Specific Integrated Circuit) Designer:

ASIC designers focus on creating custom-designed integrated circuits tailored for specific applications. This role is critical in industries such as telecommunications, aerospace, and automotive, where specialized ICs are required.

Firmware Engineer:

Firmware engineers write software that is embedded into hardware devices. They work on low-level programming, ensuring that devices function correctly. Graduates with expertise in embedded systems are well-suited for this role.

RF (Radio Frequency) Engineer:

RF engineers specialize in designing and optimizing radio frequency systems, including wireless communication devices, cellular networks, and RF circuits. This role is particularly relevant for graduates with a Microwave and Radar Engineering specialization.

Microwave Engineer:

Microwave engineers work on the design, development, and testing of microwave components and systems. They are involved in industries such as telecommunications, satellite communication, and radar technology.

Radar System Engineer:

Radar system engineers design, develop, and maintain radar systems used in defense, aviation, weather monitoring, and remote sensing. They play a crucial role in ensuring radar systems' accuracy and reliability.

	Communication System Specialist: Communication system specialists work on the design and optimization of communication networks, including wired and wireless systems. Graduates with expertise in communication systems can find opportunities in telecommunications companies and network infrastructure firms. Research and Development (R&D) Engineer: Graduates with a strong foundation in electronics system design are well-suited for R&D roles in various industries. They contribute to innovation, product development, and the advancement of technology. Academia and Teaching Positions: Some graduates choose to pursue academic careers and become professors or lecturers at universities and colleges, where they can teach and conduct research in their specialized fields. Entrepreneurship and Startups: Graduates may choose to start their own companies or join technology startups, leveraging their skills to develop innovative products or services. Consulting and Advisory Roles: Experienced professionals in electronics system design may offer consultancy services to companies seeking expertise in VLSI, embedded systems, microwave, or radar engineering. The demand for professionals with expertise in electronics system design remains high, and as technology continues to advance, new opportunities are likely to emerge. Graduates of this integrated MTech program are well-prepared to excel in these diverse career paths, whether in established industries or emerging fields of technology.
Partnership with Industry if any for the proposed programme	Ignitarium, Silizium, Bosch, Incore, VVDN, Verdant, KPIT
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the	24

proposed programme (Minimum 25)	
Proposed fees for the proposed programme	Rs 20000/- per semester
Additional Infrastructural requirements if any needed for the proposed programme	Two additional classrooms with minimum 60 strength. Lab facility with computers, equipment, and trainer kits etc. to accommodate 15 students at a time. Additional Furniture for all classrooms.

PG PROGRAMME - II

Department proposing the programme	Electronics
Name of the proposed Programme	Integrated MSc-MTech Program in Electronics System Design (with specialization)
Nature of the programme proposed	Integrated MSc.- MTech Degree (multiple exit – MSc./MSc.-MTech) MSc. Electronic Science MSc.-MTech in VLSI & Embedded systems MSc.-MTech in Microwave and Radar Engineering MSc.-MTech in Robotics and Intelligent Systems
Mode of delivery of the programme proposed	Offline/Hybrid
Duration of the programme proposed	3 years
Description of the programme proposed	The department has been traditionally offering an MSc in Electronics and MTech Program in ECE with specialisation in VLSI & Embedded systems, Microwave and Radar Engineering, and Robotics and Intelligent Systems.
Justification for launching the programme proposed	Recent years have seen a trend of a good number of MSc passed out students joining the MTech program. This program will offer them an opportunity for BSc Electronics graduates to complete the integrated MSc MTech program in 3 years instead of 4 years.
Other institutes offering similar programmes	Nil
Expected graduate outcomes of the proposed programme	Same as the Integrated MTech program

Partnership with Industry if any for the proposed programme	Ignitarium, Silizium, Bosch, Incore, VVDN, Verdant, KPIT
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	24
Proposed fees for the proposed programme	Rs 20000/- per semester
Additional Infrastructural requirements if any needed for the proposed programme	Two additional classrooms with minimum 60 strength. Lab facility with computers, equipment, and trainer kits etc. to accommodate 15 students at a time. Additional Furniture for all classrooms.

CERTIFICATION COURSE

Department proposing the programme	Electronics
Name of the proposed Programme	SoC Front-End Design
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	30 hours
Description of the programme proposed	This course imparts hands-on training for participants in SoC front End design flow using state-of-art Electronic Design Automation tools (EDA).
Justification for launching the programme proposed	VLSI/ Integrated Circuit Design and Verification has been a growing domain over the last 10 years with employers facing acute shortage of trained workforce especially at the entry level. Recent initiatives in setting up Semiconductor fabrication and design facilities in the country is going to exacerbate this scenario. C2S initiative by MietY is targeted at addressing this issue and the department has been selected to be a part of this initiative. As part of the initiative, access to all major EDA tools have been provided to the department. This program aims to train students outside the university who does not have access to these tools.

Other institutes offering similar programmes	VLSI Guru, ChipEdge, NIELIT
Expected graduate outcomes of the proposed programme	Digital Design using Verilog Verification of subsystems in SoC Exposure to state of the art tools used for design and verification of SoC.
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	Rs 5000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

MOOC PROGRAMME

Department proposing the programme	Electronics
Name of the proposed Programme	Fundamentals of Electromagnetic Interference and Compatibility
Nature of the programme proposed	MOOC
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	8 weeks
Description of the programme proposed	In our increasingly interconnected world, the proliferation of electronic devices has become ubiquitous. From smartphones and laptops to industrial machinery and medical equipment, electronics have become an integral part of our daily lives. However, this growing reliance on electronic systems has also brought to the forefront the challenges posed by Electromagnetic Interference (EMI)

and the importance of Electromagnetic Compatibility (EMC). To address these challenges and equip learners with the necessary knowledge and skills, our MOOC course, "Fundamentals of Electromagnetic Interference and Compatibility," offers a comprehensive exploration of this critical field.

Course Overview

This MOOC course is designed to provide learners with a solid foundation in understanding, mitigating, and managing EMI while ensuring EMC in electronic systems. Spanning a range of topics, the course empowers students, professionals, and enthusiasts to grasp the intricacies of EMI/EMC, making it relevant across diverse industries such as telecommunications, automotive, aerospace, and healthcare.

Course Structure

Introduction to EMI and EMC: Definitions and significance, Regulatory frameworks and standards.

Electromagnetic Theory Primer: Key electromagnetic concepts, Maxwell's equations and their relevance.

Sources of EMI: Natural vs. man-made sources, Historical context. Transmission Lines and Impedance Matching: Transmission line theory. Impedance matching techniques.

Grounding and Shielding: Grounding principles, Shielding materials and methods.

EMI Coupling Mechanisms: Conducted and radiated EMI, Common mode vs. differential mode interference.

EMI Filtering and Suppression:

Passive and active EMI filters. Components for EMI mitigation.

Circuit Layout and PCB Design for EMI: PCB layout guidelines. Design best practices.

EMI Testing and Measurement:

EMI test setups and equipment, Compliance testing.

Radiated Emissions and Immunity: Radiation characteristics., Immunity requirements and testing.

EMI in High-Speed Digital Systems: Challenges in high-speed data communication. Differential signaling.

Power Integrity and EMI: Power distribution networks. Decoupling capacitors.

Case Studies and Practical Applications: Real-world examples and solutions. Industry-specific challenges.

EMI Mitigation Strategies and Future Trends: System-level mitigation. Emerging technologies and their EMI implications.

Conclusion

In an era where electronics are deeply embedded in our daily lives, understanding and effectively managing

	Electromagnetic Interference (EMI) while ensuring Electromagnetic Compatibility (EMC) is paramount. Our MOOC, "Fundamentals of Electromagnetic Interference and Compatibility," offers a comprehensive and flexible learning experience that equips you with the knowledge and skills to tackle EMI/EMC challenges in various industries. Whether you're a student, a professional, or simply curious about this vital field, this course provides the foundation you need to excel in an increasingly electrified world. Enroll today and embark on a journey to master EMI/EMC fundamentals.
Justification for launching the programme proposed	**Admission Criteria:** To ensure that the MOOC course on the Fundamentals of Electromagnetic Interference and Compatibility attracts the right participants and maintains high-quality learning experiences, consider implementing the following admission criteria: ● Open to participants with a basic understanding of electrical engineering, electronics, or related fields. A minimum prerequisite of a bachelor's degree in a relevant discipline or equivalent experience may be required. ● A statement of purpose or a brief essay explaining the participant's motivation for taking the course can help gauge their commitment and interest. **Target Audience:** The MOOC on Fundamentals of Electromagnetic Interference and Compatibility is designed to cater to a broad audience, given the widespread relevance of EMI/EMC in various industries: **Electrical and Electronics Engineers**: This course will serve as a valuable resource for professionals seeking to enhance their knowledge and skills in managing EMI/EMC challenges in their work, including those involved in designing and testing electronic systems. **Engineering Students**: Undergraduate and graduate students pursuing degrees in electrical engineering, electronics, or related fields can use this course to supplement their formal education and gain practical insights. **Technical Professionals**: Individuals working in fields such as telecommunications, automotive, aerospace, medical devices, and industrial automation will find this course beneficial to address EMI/EMC issues in their specific industries. **Design and Testing Engineers**: Professionals responsible for designing and testing electronic circuits and systems will benefit from the practical knowledge

and skills offered in this course.

Enthusiasts and Hobbyists: Even those without formal educational backgrounds in engineering but with a keen interest in electronics can enroll in this course to gain a foundational understanding of EMI/EMC principles.

Demand Assessment:

The market demand for a MOOC course on Fundamentals of Electromagnetic Interference and Compatibility is substantial and increasing for several reasons:

Industry Demand: As electronic systems become more complex and prevalent, industries across the board require professionals who can address EMI/EMC challenges to meet regulatory requirements and ensure the reliable operation of their products.

Regulatory Requirements: Compliance with EMI/EMC standards and regulations is mandatory in many sectors (e.g., automotive, aerospace, healthcare). Professionals seek courses to understand and meet these requirements.

Continuous Learning: Engineers and technical professionals recognize the need for continuous learning to stay competitive and relevant in their careers. This course offers an opportunity for skill enhancement.

Accessibility: MOOCs offer accessibility to a global audience, making it easier for individuals nationwide to access quality education in EMI/EMC.

Career Advancement: Completing this course can lead to career advancement opportunities and increased earning potential for participants in technical roles.

In conclusion, the MOOC course on Fundamentals of Electromagnetic Interference and Compatibility is well-positioned for market viability due to the strong demand from professionals, students, and enthusiasts in various industries and the course's flexibility in catering to a diverse audience. By implementing appropriate admission criteria and marketing strategies, this course can successfully meet the educational needs of a wide range of learners while contributing to their professional development.

Other institutes offering similar programmes	KTH Royal Institute of Technology and NPTEL via Swayam
Expected graduate outcomes of the proposed programme	What kind of career opportunities for participants if they successfully complete the course

Partnership with Industry if any for the proposed programme	Convergent Technologies
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	minimum 25
Proposed fees for the proposed programme	1000 Rs per applicant
Additional Infrastructural requirements if any needed for the proposed programme	Nil

2.11 DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES

CERTIFICATION COURSE

Name of the proposed Programme	**1. Post Graduate Diploma in Academic Writing** **2. Diploma in Literary and Cultural Theory and Criticism for Research**
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	Post Graduate Diploma in Academic Writing – 6 months Diploma in Literary and Cultural Theory and Criticism for Research – 6 months

Description of the programme proposed	**I. Post Graduate Diploma in Academic Writing**
	
	  Academic writing is a formal style of writing used in universities and scholarly publications. It communicates ideas, information and research to the academic community. The four main types of academic writings as well as the grammar, sentence skills and a set of academic vocabulary will be covered in the course.
	Course Objectives
	   - To train the students in writing that focuses on the basic elements of academic writing. - To impart knowledge in the formal tone and style in writing. - To familiarize the language used in academic contexts. **Course Outcomes**
	  After the completion of the course the learner will be able to:
	   - Engage in writing processes that are academically appropriate. - Communicate clearly with minimal amount of distortion and misinterpretation. - Will have an enriched academic vocabulary. **II. Diploma in Literary and Cultural Theory and Criticism for Research**
	
	Course Objective
	
	  This programme is designed for Graduates in Humanities who would like to take up research. This course will help students familiarise with basic premises of

the foundational schools of modern thought, particularly on the subject, language and socio-cultural formation.

<u>Course Outcome</u>

At the end of the course it is expected that the students:

- Would hone their analytical and critical faculties drawing inspiration from the texts provided.
- Gain an idea of the evolution of critical thinking in Europe and India in 20th and 21st centuries.
- Understand the function of language in the construction and analysis of Literature.
- Gain insights to use these major schools of thought as tools for literary research in order to have a firm grasp of the complexities of literary discourses.

Justification for launching the programme proposed	<u>I. Post Graduate Diploma in Academic Writing</u>There has been a huge demand from the research scholars of Science and Technology streams. <u>II. Diploma in Literary and Cultural Theory and Criticism for Research</u> This course will give practical help to students of Humanities who would like to undertake research. Cultural/Literary theory and criticism can be adequate tools to conduct research in Humanities.
Other institutes offering similar programmes	-
Expected graduate outcomes of the proposed programme	Both the courses will help the researchers immensely.
Partnership with Industry if any for the proposed programme	-
Partnership with foreign universities if any for the proposed programme	-
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs.7000/-
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.12 DEPARTMENT OF HINDI

CERTIFICATION COURSE

Name of the proposed Programme	Certificate course in Green Literature
Nature of the programme proposed	Certification
Mode of delivery of the programme Proposed	Offline and Hybrid
Duration of the programme proposed	3 months/36 Hours @ 3 hrs/week
Description of the programme proposed	In the current scenario of rising pollution and man- made disasters that cause irrevocable damage to the eco-system this literature programme intends to impart general awareness of ecology and the necessity of keeping the balance between environment and human activities without much affecting the inevitable economic activities of the society and evolves reliable and tangible solutions for the ecological issues of major concern. Also gives a general idea about the individual responsibility and the necessity in complying various environmental protective measures implemented by the Government so as to minimise the environmental damage. It will help to nurture a culture in the society that will make them bother about the consequences/adverse effects of each human activity on the nature and makes them to use judicially the available resources which in turn will pave the way for a good and healthy social set up.
Justification for launching the programme proposed	To make realize the individuals through literature that most of the environmental damage caused to the society is due to their irresponsible and self centric activities. It will be a viable approach to educate the student community about the ecological implications.
Other institutes offering similar programmes	Nil
Expected graduate outcomes of the proposed programme	1. The knowledge acquired by students will make them more responsible and hence the ecological issues can be addressed more effectively and easily in daily life. 2. The burden of the Government will be greatly eased and hence the energy and fund spared in this regard can be diverted for productive purposes. 3. As most of the disasters of the current scenario are man-made, each individual will be at alert against such unethical and ecological damage-causing activities of the society and hence it can be prevented at the grass root level itself.

Partnership with Industry if any for the proposed programme	It consists of industrial visits that enable the Students to have first hand information about the extent and the nature of pollution caused by the industry that may equip individuals to combat the menace.
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed Programme (Minimum25)	25
Proposed fees for the proposed programme	Rs.5000/-
Additional Infrastructural Requirements if any needed for the proposed programme	Support of the labs of the department Of Environmental Studies Department Of Bio-Technology & STIC are sought for the water quality analysis and related studies.

MOOC PROGRAMME – I

Name of the proposed Programme	MOOC Programme
Nature of the programme proposed	Elective Course in Comparitive Literature
Mode of delivery of the programme Proposed	Online
Duration of the programme proposed	4 months/48 Hours @3 hrs/week
Description of the programme proposed	Comparitive literature includes the study of two or more literature in comparison. It deals with the multi dimentional components which may encompass aspects such as the Historical, Gender, Economic, Cultural, Social, Philosophical, Religious and Linguistic factors of the respective literatures. The goal of comparative literature is to create a coordinated, creative and collective resistance against all types of cultural discriminations such as class, caste, creed, region and Language. Its main goal is to examine the literary soul of the world from a universal perspective. This course has been designed with the aim of introducing the students with pervasive trends and movements in both the Hindi and the Malayalam literature. Unit-1 Comparative Literature: Concept, Meaning,

	Definition, Nature, Goals, Important Beliefs related to Comparative Literature: Development Western and Indian Comparative Literature. Comparative Literature and Indian Literature-Role Of translation in comparative literature. **Unit-II** Various stages of development of Hindi and Malayalam literature-Adikaal: Veer Kavya Bhakti Kavya: Krishna Bhakti Kavya: Sura and Cherusheri Ram Bhakti Kavya: Tulsi and Eshutchan-Riti and Champukal **Unit—III** Modern Period: National Poetry, Romantic Poetry, Progressive Poetry, New Poetry, Contemporary Poetry. **Unit—IV** Hindi Malayalam Novel, Hindi Malayalam Drama, Hindi Malayalam Story, Hindi Malayalam Criticism. **Unit—V** Comparative study of the works of two writers Study of selected stories of Chitra Muddal and Chandramati.
Justification for launching the Programme proposed	To provide an analysis of the Literatures of Hindi and Malayalam.
Other institutes offering similar Programmes	Nil
Expected graduate outcomes of the proposed programme	1. This will provide the essence of the Literatures in Hindi and Malayalam in general. 2. Enables the student to have a comparative study of both the languages. 3. Through the study of this, they will be equipped to differentiate different languages and culture in a different perspective.

Partnership with Industry if any for The proposed programme	N.A
Partnership with foreign universities If any for the proposed programme	No.
Number of seats in the proposed Programme (Minimum25)	N.A
Proposed fees for the proposed Programme	As per university rules.
Additional infrastructural Requirements if any needed for the proposed programme	N.A

MOOC PROGRAMME – II

Department proposing the programme	Department of Hindi
Name of the proposed Programme	MOOC Programme
Nature of the programme proposed	Elective Course in Ecological Discourse
Mode of delivery of the programme Proposed	Online
Duration of the programme proposed	4 months/48 Hours @3 hrs/week
Description of the proposed programme	Ecological Discourse is a new field of study. It gives an overall understanding of the inter woven relationship between nature and man and emphasizes that for a bright future, nurturing instead of exploitation of nature is to be adopted/resorted. As a result of this understanding, a new movement started all over the world and this ecological awareness also got reflected in the literature. Therefore, the study of this Literary Discourse underlines the relevance in the current scenario. Unit l- Ecological aesthetics- Ecological thinking and its foundation-Various branches Deep- Social-Marxist and Eco-Feminism-Ecological discussion-Beginning-Paradigm - Various causes of environmental exploitation-Globalization and development plans Consumption culture Environmental protection movement in the western country and Movement in India-Environmental Discourse in literature

	Environmental Discourse in Hindi literature.
Justification for launching the programme proposed	To make the students aware about the ecology and Ecological discourse in a better way which is most relevant in the present scenario .
Other institutes offering similar programmes	Nil
Expected graduate outcomes of the proposed programme	1. The students referring this will have an insight into the dealt topic. . Easy access to the topic uploaded in the MOOC portal for all. 3. As the presentation is elaborated in a simple language and so precisely, it is easy to understand.
Partnership with Industry if any for The proposed programme	N.A
Partnership with foreign universities If any for the proposed programme	No.
Number of seats in the proposed Programme (Minimum 25)	N.A
Proposed fees for the proposed programme	As per university rules.
Additional infrastructural Requirements if any needed for the proposed programme	N.A

2.13 DEPARTMENT OF INSTRUMENTATION

CERTIFICATION COURSE

Name of the proposed Programme	Process Control and Automation
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	3 Months
Description of the programme proposed	Process Control and Automation is concerned with the design, development, installation, and maintenance of systems which monitor parameters so as to ensure automated control of processes. It is used to increase productivity, reduce costs, and improve quality and safety. Process Control and Automation training and certification course provides the necessary skills and knowledge to operate and maintain automated systems. This course covers topics such as PLC programming, DCS, and HMI design. Also provides a comprehensive understanding of the principles and practices of process control and automation. This course is aimed at moulding an Engineer by providing hands-on training and a competitive designer of industrial systems with the use of PLCs, DCS, Process Station, Data Acquisition Boards, and LabVIEW Software from National Instruments. The course also includes an industrial-oriented project work during which the student will be working on a specific assignment.
Justification for launching the programme proposed	Almost all processing and manufacturing industries such as aviation, automobile, petrochemical, fertilizer, power, steel manufacturing and defence have separate control and automation departments. They are required in various roles like control system design, calibration, automation, quality control, maintenance and so on. So the sector of process control and automation opens up a wide range of opportunities in the present world. Because of its interdisciplinary nature, this sector bestows opportunities inside and outside the industry.
Other institutes offering similar programmes	● PG Diploma in Industrial Automation System Design offered by the National Institute of Electronics and Information Technology (NIELIT) Calicut.
Expected graduate outcomes of the	Job roles: ● Process Control Engineer/Technician

proposed programme	• Automation Engineer/Technician • Instrumentation Engineer/Technician • Project Engineer/ Design Engineer • PLC/DCS Technician Duties: • Design, install and test automated production systems. • Operation, control and maintenance of instrumentation and control systems in process industries such as oil refineries, petrochemical plants, fertilizer units, steel power plants, pharmaceuticals plants etc.
Partnership with Industry if any for the proposed programme	Yokogawa India Limited, Bangalore
Partnership with foreign universities if any for the proposed programme	NA.
Number of seats in the proposed programme (Minimum 25)	25 (Number of candidates can be trained in a year 75)
Proposed fees for the proposed programme	Rs 20000/-
Additional Infrastructural requirements if any needed for the proposed programme	Process Control Lab (PLCs and DCS). PLCs and DCS including Process Station have been sanctioned via KIIFB funding and will be installed in the department in two months duration.

2.14 INTER UNIVERSITY CENTRE FOR IPR STUDIES (IUCIPRS)

CERTIFICATE PROGRAM

Name of the proposed Programme	PATENT LITERATURE SEARCH
Nature of the programme proposed	Certificate program
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	6 months (3 papers of 3 credits)
Description of the programme proposed	A brief note on the content of the programme (Max 500 words) Prior Art Search is a critical step in the patent application process that involves examining existing literature and technologies to determine if an invention is novel and non-obvious or if a competing product or process is subject of patent infringement. This certificate program is particularly focused on identifying the resources available to carry out a prior art search and enable to perform a patent literature search for the purpose of ascertaining patentability. Failing to conduct a Prior Art Search can have legal consequences. If a patent is granted for an invention that already exists in the prior art, it can lead to costly legal disputes, infringement claims, and the potential invalidation of the patent. Thus, a thorough search minimizes these risks and ensures that the patent application is based on solid grounds. By revealing what has already been done in a particular field, a Prior Art Search can inspire inventors to explore new directions and build upon existing knowledge. It can help identify gaps and areas where innovation is needed, thereby promoting a culture of continuous technological advancement. The objectives of the programme include 1. To understand the role of literature search in promoting Innovation. 2. To identify the different patent literature information resources for performing a prior art search. 3. To learn the different search strategies for carrying out a patent literature search. 4. To develop the skills to perform a patent literature search.
Justification for launching the programme proposed	The course would equip individuals with the knowledge and skills necessary to conduct thorough patent literature

	searches. This, in turn, encourages innovation by helping inventors identify gaps in existing technologies and build upon prior art. With more individuals trained in patent literature search techniques, there is a greater likelihood of high-quality patent applications. Many industries, such as technology, pharmaceuticals, and biotechnology, rely heavily on patents. Introducing a certificate course aligns with the demand for professionals who can effectively navigate patent databases and analyze prior art.
Other institutes offering similar programmes	WIPO e learning Academy, Geneva
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of Science and Technology PG and PhD professionals in Intellectual Property law firms and in industries with In-house IP departments such as Pharmaceuticals, Biotechnology and IT among others. Aspiring entrepreneurs can benefit from this course by learning how to evaluate the patent landscape for potential business ideas.
Partnership with Industry if any for the proposed programme	None
Partnership with foreign universities if any for the proposed programme	None
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	INR 50,000
Additional Infrastructural requirements if any needed for the proposed programme	Resource teachers on contract.

MOOC PROGRAMME

Name of the proposed Programme	PATENTING INVENTIONS: PRACTICE AND INTRODUCTION TO TOOLS
Nature of the programme proposed	MOOC
Mode of delivery of the programme proposed	Online

Duration of the programme proposed	One semester (3 credit)
Description of the programme proposed	This course is designed to sensitize the Science and Technology PG students of CUSAT the relationship between science, technology, society and IPR, in particular patents. The course is also intended to make the students understand the role patent law plays in promoting creativity and encouraging the products of research reaching the society through industrial production and distribution. The course will also provide the students with hands on experience to various freely available tools to make a preliminary assessment of the novelty of inventions and compose a patent application.
Justification for launching the programme proposed	Patents are crucial for protecting intellectual property, which drives innovation and economic growth. Educating a wide audience about patents, patent searching, and patent application drafting contributes to a better understanding of intellectual property rights. Knowledge about patents and the patent application process can inspire and empower individuals to innovate. MOOC participants, especially aspiring entrepreneurs and startup founders, can learn how to protect their innovations, secure funding, and navigate the complex process of patent applications, enhancing their chances of success. Professionals in various fields, including law, engineering, science, and business, can benefit from this course by gaining expertise in patent-related matters.
Other institutes offering similar programmes	None.
Expected graduate outcomes of the proposed programme	Individuals will gain a comprehensive understanding of the patent system, including the types of patents, the importance of intellectual property, and the patent application process. They will also learn how to draft patent applications, including writing clear and concise patent claims and descriptions, which is invaluable for inventors and professionals. Those seeking careers in intellectual property law, patent examination, technology transfer, or research and development will be better positioned to pursue relevant opportunities and advance in their chosen fields.
Partnership with Industry if any for the proposed programme	None.
Partnership with foreign universities if any for the proposed programme	None.

Number of seats in the proposed programme (Minimum 25)	60
Proposed fees for the proposed programme	INR 2,000
Additional Infrastructural requirements if any needed for the proposed programme	None.

2.15 INTERNATIONAL SCHOOL OF PHOTONICS

CERTIFICATION COURSE

Name of the proposed Programme	MATERIAL CHARACTERIZATION TECHNIQUES
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	30 hours
Description of the programme proposed	The course is aimed to provide a basic understanding of most commonly employed material characterization tools such UV-Vis Spectroscopy, Fluorescence Spectroscopy, Raman Spectroscopy, FT-IR Spectroscopy, Electron Microscopy etc. Fifty percentage of the class hours will be dedicated for hands-on training in collaboration with STIC, CUSAT.
	The course is structured into two segments, addressing pivotal aspects of material structures and characterization. The initial section will concentrate on microstructure imaging through various microscopy techniques, while the latter part will delve into comprehending internal structures through diffraction phenomena. To achieve this, the initial lectures will present foundational concepts of image formation and its inherent attributes, progressing to specifics about distinct imaging methods like light/optical microscopy and electron microscopy. Subsequently, the course will delve into the fundamentals of diffraction phenomena and associated techniques, utilizing X-ray sources. Throughout the exploration of these characterization techniques, there will be a consistent emphasis on their significance in materials research and their practical applications in real problem-solving scenarios.
Justification for launching the programme proposed	Starting a course on material characterization techniques is justified for several reasons:
	1.Critical for Materials Science and Engineering:
	Material characterization is fundamental to the field of materials science and engineering. Understanding the properties and structures of materials is essential for

designing new materials and improving existing ones.

2.Bridge between Theory and Application:

Material characterization techniques provide a bridge between theoretical knowledge and practical applications. Students learn not only about the theoretical aspects of materials but also how to analyze and apply this knowledge in real-world situations.

3. Innovation and Technology Advancement:

Advancements in materials characterization techniques often lead to innovations in various industries. Teaching these techniques prepares students to contribute to technological advancements and innovation in fields such as electronics, healthcare, energy, and more.

4.Quality Control and Assurance:

Many industries rely on specific material properties for product quality. Understanding material characterization is crucial for quality control and assurance, ensuring that materials meet the required standards and specifications.

5. Interdisciplinary Nature:

Material characterization involves interdisciplinary knowledge, drawing from physics, chemistry, engineering, and biology. A course in this area provides students with a holistic understanding, making them versatile professionals.

6.Relevance to Research and Development:

Researchers in academia and industry continually seek new materials with improved properties. A course on material characterization equips students with the skills needed to contribute to research and development efforts.

7.Career Opportunities:

Professionals with expertise in material characterization techniques are in demand in various industries, including aerospace, automotive, biomedical, and electronics. Providing students with these skills enhances their employability.

This ensures that students are familiar with the latest tools used in materials research.

	The programme will be best suited for • Young professionals and university graduates interested in a research/industry related material science. • Industry professions who wish to improve their skills. • Research students who are working in related areas.
Other institutes offering similar programmes	There are a few online/MOOC courses in this area. But, courses offering hands-on training are not quite available.
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of fresh graduates in various industries as well as in research. It will give additional competencies to working professionals.
Partnership with Industry if any for the proposed programme	STIC, CUSAT
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	Rs 10,000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.16 KUNJALI MARAKKAR SCHOOL OF MARINE ENGINEERING (KMSME)

CERTIFICATION COURSE

Name of the proposed Programme	Engine Room Simulator (Management/Operational Level)
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	• Duration: 3 Days (For the Operational Level)/5 Days (For the Management Level), 100% attendance and a score of not less than 70% in the internal assessment are compulsory, for issue of course certificate. • Timing : 9 AM to 4 PM
Description of the programme proposed	The Engine Room Simulator provides facilities to meet the international and national training requirements for engineer officers at MEO Class IV, Class II and Class I levels. The trainees are given experience of tackling emergency situations, various operational aspects of the vessel and its machinery, troubleshooting and role-play exercises during the training. The Full Mission Engine Room Simulator Course conducted at Kunjali Marakkar School of Marine Engineering, Cochin University of Science and Technology is approved by Directorate General of Shipping, Govt. of India, meets the requirements laid down in Regulation 1/12, Code A-1/12 and B-1/12.73 of STCW Convention 1978 as amended and is in compliance with IMO Model Course 2.07(Engine Room Simulator). It is an interactive course that also helps to foster team behaviour and interpersonal roles within the team.
Justification for launching the programme proposed	The engine room simulator course enable the candidates to get a virtual feel of actual ships engine room and as our simulator uses new engines for simulation, the cadets are able to study the latest developments and familiarize with latest technologies used in marine engines. Further various scenarios and faults can be injected and consequences can be easily understood using this simulation course. This empower candidates to face actual problems on board with more confidence.

Other institutes offering similar programmes	Other Maritime Training Institutes
Expected graduate outcomes of the proposed programme	• To familiarize the trainees with the use of instrumentation and controls, extensively used in engine rooms of modern merchant ships • To gain knowledge in understanding the correct procedure for watchkeeping • Acquisition of knowledge and experience in identifying operational problems and troubleshooting
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	12
Proposed fees for the proposed programme	• Rs 8,000 for the Engine Room Simulator Operational Level • Rs 11,000 for Engine Room Simulator Management Level
Additional Infrastructural requirements if any needed for the proposed programme	Nil

2.17 DEPARTMENT OF MARINE BIOLOGY, MICROBIOLOGY & BIOCHEMISTRY

CERTIFICATION COURSE - I

Name of the proposed Programme	Ornamental Fish Breeding and Seed Production
Nature of the programme proposed	Certificate/ Diploma
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	24 Weeks (720 Hrs)/6 months
Description of the programme proposed	The ornamental fish trade is among the world's fastest-growing sectors, with a 20% annual growth rate and lucrative livelihood opportunities for the rural public, including women. The proposed six-month certificate/ diploma programme in Breeding and Seed Production of Ornamental Fishes is intended to offer hands-on training in broodstock management, seed production and larval rearing of commercially important ornamental fishes, including marine ornamental fishes. It is a vocational skill development programme targeting genuine entrepreneur candidates. The programme will be highly useful for all those who stepped into the ornamental fish industry without a proper professional background. The objectives of the programme include - To familiarise scientific methodologies in ornamental fish seed production, rearing and trade among the ornamental fish farming community - To make the upcoming entrepreneurs aware of effective hatchery management practices (Physical and financial) - To popularise marine/brackish water ornamental fish seed production and trade to the entrepreneurs. - To create awareness among entrepreneurs about the deleterious effect of over-exploitation of natural ornamental resources, thereby reducing wild capture of ornamental fishes. - To create awareness about the rules and regulations related to the international trade of living organisms and procedures after introduction, thereby preventing species invasion and trans boundary diseases. - To empower rural women through skill development.

Justification for launching the programme proposed	In India, the domestic trade of ornamental fish exceeds 500 crores annually, and the demand at the domestic level is higher than the supply. Kerala is also an emerging contributor to the scenario; however, West Bengal and Tamilnadu are the leading producers, contributing more than 85% of the total production. Though the state is bestowed with suitable agroclimatic conditions, organized expansion of ornamental fish farming and quality seed production is rare. The emergence of authorized /unauthorized backyard ornamental fish production centres is a regular practice in Kerala. Many of them are started by hobbyists who don't have proper scientific knowledge and appropriate physical and financial management. Because of the same reason, a good percentage of them are unable to succeed. Besides, due to scientific illiteracy or purposeful negligence, the illegal trade/import of ornamental fish is a regular practice, resulting in species invasion and transboundary disease. Creating awareness among fish farmers and importers about rules and regulations in the ornamental fish trade, post-import procedures, and quarantine measures is essential to safeguard our ecosystem and biodiversity. This certificate course envisages to impart scientific awareness in the breeding and seed production of ornamental fishes and physical and financial management of the hatchery/ farm to the rural public, including women, to make them self-sustainable and financially independent. ● Small-scale ornamental fish farmers ● Women self-help groups (SHGs) ● Fisheries and aquaculture graduates ● Anyone who is interested in ornamental fish farming and trade.
Other institutes offering similar programmes	RGCA, KUFOS
Expected graduate outcomes of the proposed programme	It helps to make rural public self-sustainable through regular income generation activities.
Partnership with Industry if any for the proposed programme	
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	30

Proposed fees for the proposed programme	Rs 30000
Additional Infrastructural requirements, if any, needed for the proposed programme.	Facilities for broodstock management and seed rearing (Annexure 1)

CERTIFICATION COURSE – II

Name of the proposed Programme	Live Feed culture techniques in Aquaculture
Nature of the programme proposed	Certificate/ Diploma
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	24 Weeks (720 Hrs)
Description of the programme proposed	Live feeds are very important for any aqua-hatchery system, where the successful larval production depends primarily on the quality live feed provided to the larvae during its most vulnerable stages of development. Trained and skilled manpower is very essential for the aquaculture industry. **The objectives of the programme include** 1. To create skilled workforce in the aquaculture industry in the country 2. To develop entrepreneurship and job opportunities 3. To update technical knowledge in professionals already engaged in aquaculture activities 4. To create awareness and promote quality and environmental-friendly practices in Live Feed Technology for Aquaculture. **Proposed Outline of the Course** The course will train candidates on the production of live feeds required in hatcheries for the production of aquaculture seeds. Field identification and Life history traits of Live Feeds used in fresh water, brackish water and mariculture. Infrastructure Facility Development and Management Water Quality Management for Live Feed Culture Isolation and Pure Culture of microalgae Mass Production of Micro Algae Isolation and Pure Culture of Zooplankton Mass Production of Zooplankton Isolation, Pure Culture and Mass Production of live feeds

	used in broodstock management (Polychaets, Oligochaetes, Nematodes, Chironomids, etc.) Artemia hatching and enrichment Transportation and Marketing of Live Feeds Marketing and profit analysis Field visits to production units and research centres
Justification for launching the programme proposed	The present skill development certificate course will be introduced with a view to enhance employability and entrepreneurship among young enthusiasts in Live Feed culture Technology. The present course is one of its kind and first time introduced by the Cochin University of Science and Technology. The syllabus emphasises on the overall skill development in the area of Live Feed Technology among the trainees. The course will be introduced as certificate (diploma) course for six months. The course includes basic theory and hands on practical training in the live feed technology to empower the trainees. At the end of the course, the candidates will be skilled in selection of suitable live feed species for specific aquaculture species, their isolation, mass culture and marketing. The trained manpower will be able to get employed in aqua-hatcheries and other industries where live feed production is required. This trained manpower will be able to operate independently as entrepreneurs providing support for aqua-hatcheries. The target groups are Plus-two completed students • Fisheries and aquaculture graduates • Small-scale ornamental fish farmers • Women self-help groups (SHGs) • Anyone who is interested in aquaculture industry.
Other institutes offering similar programmes	RGCA, CMFRI
Expected graduate outcomes of the proposed programme	It helps to make rural public self-sustainable through regular income generation activities.
Partnership with Industry if any for the proposed programme	CMFRI
Partnership with foreign universities if any for the proposed programme	Not any, at present
Number of seats in the	30

proposed programme (Minimum 25)	
Proposed fees for the proposed programme	Rs 30000
Additional Infrastructural requirements if any needed for the proposed programme	Facilities for live feed mass culture (Annexure 1)

2.18 DEPARTMENT OF MARINE GEOLOGY & GEOPHYSICS

CERTIFICATION COURSE

Name of the proposed Programme	Certification in Geo-informatics in Earth Sciences
Nature of the programme proposed	Short-term certification course
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	6 Months
Description of the programme proposed	Geo-informatics in Earth Sciences is a multidisciplinary field that focuses on the application of geospatial techniques and information science to study and understand Earth's processes. It involves the collection, analysis, and interpretation of geospatial data such as satellite imagery, GPS data, and geological maps to address various Earth science questions and challenges. Geo-informatics aids in monitoring and modeling natural phenomena like climate change, geological hazards, land use - land cover (LULC) changes, and environmental conservation. It plays a vital role in advancing research, decision-making, and sustainable management practices in the Earth Sciences by harnessing the power of spatial data and cutting-edge technology.
Justification for launching the programme proposed	Launching a GIS program stands as a justified initiative given the robust market demand for GIS skills, well-defined admission criteria, and the program's broad appeal, catering to recent graduates, seasoned professionals, and dedicated researchers. This program holds immense potential to fulfil the increasing demand for GIS professionals, thereby opening substantial career opportunities for its graduates. Our wealth of human resources possesses significant untapped potential, and offering them proper guidance can yield improved job prospects. In the context of Earth Science, GIS emerges as exceptionally viable due to its pivotal role in data analysis, precise mapping, and informed decision-making. Its relevance extends to crucial areas such as environmental management, geological research, urban planning, and disaster preparedness. The proposed program will serve a diverse range of audience, including Earth Science researchers,

	governmental bodies seeking effective resource management, environmental consultants engaged in sustainable practices, urban planners striving for smarter city development, resource-centric entities like mining and energy companies, NGOs dedicated to conservation and disaster relief, as well as academic institutions aiming to equip students with valuable GIS skills.
Other institutes offering similar programmes	MG University, Kerala University, IIRS, Dehradun Centre for Environment and Development, Trivandrum Institute of Photogrammetry and Geo Informatics (IPGI), Delhi
Expected graduate outcomes of the proposed programme	Graduates of a Geo-Informatics in Earth Sciences program can look forward to a host of valuable outcomes that prepare them for dynamic career opportunities in a variety of fields. Some expected graduate outcomes along with corresponding career opportunities are GIS Analysts/Technicians, Spatial Data Scientists, Environmental Consultants, Geological Analysts, Urban Planners, Disaster Management Specialists, Research Collaborators, GIS Project Managers, Scientists, Academic Educators, GIS Developers, Remote Sensing Specialists and Spatial Data Administrators.
Partnership with Industry if any for the proposed programme	(In Progress)
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs. 30,000/-
Additional Infrastructural requirements if any needed for the proposed programme	Requirement of ad-hoc faculty specialized in Geo-informatics in Earth Sciences or relevant fields. A class room is required to accommodate 25 students Expenses for the purchase and renewal of GIS software.

2.19 DEPARTMENT OF MATHEMATICS

MOOC PROGRAMME

Name of the proposed Programme	COMPUTATIONAL MATHEMATICS IN DATA SCIENCE
Nature of the programme proposed	MOOC
Mode of delivery of the Programme proposed	Online
Duration of the programme proposed	15 weeks (45 hours) (Total Credits- 4)
Description of the programme proposed	"Computational Mathematics in Data Science" is a specialized academic program designed to cultivate foundational mathematical and computational competencies significant for addressing complex problems in the field of Data Science. The course integrates mathematical principles with their practical application across diverse domains. The course will empower students with the required tools and expertise for getting meaningful insights for their problem domain through Python programming. This course is also tailored to foster students' proficiency in research at an applied level, augmenting their capacity to formulate algorithms. The purpose for the development of algorithms is to perform analysis in their specific domain of study with an exposure to relevant industry applications.
Justification for launching the programme proposed	This course holds great significance in advancing AI and machine learning in the field of Information Technology, healthcare, finance and banking, etc. It focuses on developing mathematical and programming skills for creating machine learning models and algorithms that can be applied across various fields to enhance decision-making and predictions. In summary, this course equips students across diverse industries with essential skills for data-driven innovation, efficiency, and problem-solving, in their respective domains. The proposed MOOC Course is relevant to a wide range of industries, including Information Technology, Healthcare, Finance and Banking, Energy and Environmental sectors, Marketing and Advertising, the Automobile Industry, Public Safety, etc.
Other institutes offering similar programmes	IIT Roorkee, Online courses in Udemy

Expected graduate outcomes of the proposed programme	Will boost career opportunities in industries under Information Technology sector, Health care sector, Finance and Banking sector, Energy and Environmental sector, Marketing and Advertising sector, Automobile Industry, Public Safety and Law Enforcement sector etc. It will give additional competencies to working professionals.
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme	Limited to 45 Seats ▪ Cusat community: Limited to 30 seats ▪ Outside Community: Limited to15 seats
Proposed fees for the proposed programme	Rs.1000/- (Exam Fee) Evaluation: Assignments & Final Evaluation Exam
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.20 NATIONAL CENTRE FOR AQUATIC ANIMAL HEALTH (NCAAH)

PG PROGRAMME – I

Name of the Programme Proposed	**International Postgraduate Programme in Aquatic Animal Health Management.**
Nature of the proposed programme	New degree
Mode of delivery programme proposed	Offline
Duration of the Proposed programme	2years
Description of the programme Proposed	The objective of the course is to generate at the highest level of specialization Scientists, Academicians and Planners in **Aquatic Animal Health Management** having global perceptiveness.
Justification for launching the programme proposed	Aquaculture is the fastest-growing food production sector, but the progress very much hampered by the onset of variety of diseases from time to time destabilizing the production. Requirement is the integration of disease detection, diagnosis, and management with the aquaculture practices at all strata starting from brood stock to harvest. Such an outcome can be expected only if Graduates in Fisheries/ Aquaculture and Animal Science are recruited and educated in the discipline. The programme is made International as the pathogens and parasites are either same or comparable and a global consciousness and awareness is required to address the issues as the pathogens and parasites move across the continents. **A global community of Aquatic Animal Health Managers is the essential requirement to effectively contain the diseases.** It is aimed to open the programme to **all South East Asian Countries**, as the trans boundary movement off is he sat various stages happen among these countries. The programme must be financially supported by all participating countries, and building up such a platform is the exciting challenge in front.
Other institutes offering similar programmes	Nil
Expected graduate outcomes of the proposed programme	The students qualifying the degree will be able to address the critical issues in global aquaculture sector through the adoption and development of processes and products in aquatic Animal Health Management.

Partnership with Industry if any for the proposed programme	Aquaculture Industry who will provide avenues for training, and studentships in completing specific tasks.
Partnership with foreign universities if any for the proposed programme	Participation of foreign Universities has been envisaged
Number of seats in the proposed programme	20
Proposed fees for the proposed programme	Rs.20,000/Semester
Additional Infrastructural requirements if any needed for the proposed programme	**Strengthening the following facilities:** 1. Aquaculture Medicine Production Unit 2. Repository of Finfish and Shell fish Cell Lines 3. Repository of Live Feed Organisms 4. Disease Diagnostic Facility 5. Fish Hospital 7. Aquatic Animal Quarantine Facility 8. Multi species fish hatchery (CUCEK) 9. RAS facility 10. Aquaponics/Biofloc technology **MoUs to be signed with** 1. Broods to ck Development Centres 2. Seed production Centres 3. Extensive and Intensive farms The programme is aimed to be commenced from 2025 academic year provided all requirements such as curriculum development in consultation with the participating Institutions, sponsorship, appointment of Faculty one Associate Professor and two Assistant Professors, allocation or building up of adequate space, development of dedicated practical class rooms, constitution of Board of Studies are met with. Candidates shall be from different countries in south east Asia.

PG PROGRAMME – II

Name of the proposed Programme	M.Tech. Aquaculture Engineering (With Global outlook)
Nature of the programme proposed	New degree
Mode of delivery of Programme proposed	Offline
Duration of the programme proposed	2years
Description of the programme proposed	A special meeting of the Advisory Board of NCAAH was held on 23-7-2016,the second

	day of the **National Workshop on Sustainable Aquaculture Production Systems**, convened as part of Indo - US 21st Century Knowledge Initiative sponsored by the University Grants Commission from 22nd to 24th, July 2016. During the workshop, it had come to the concern of the delegates the need for a **Facility at National level** for Developing, Standardizing and Popularizing Sustainable Aquaculture Production Systems such as RAS, Aquaponics, BFT, IMTA, open sea cages, Raceways, and ZWEAPS in the Country. It was deeply felt that such an Institution should catalyse the rapid spread of intensification of aquaculture with sustainability. As the need of the hour is intensification of aquaculture production inclusive of the same in small holdings, wherefrom much of the fish biomass used to be generated, novel, user friendly and economically viable intensive aquaculture technologies were to be developed befitting to the diverse, but at the same time ecologically sensitive aquatic environment. The Advisory Board meeting was convened to discuss this issue. During the meeting it was resolved that once the facility is established, NCAAH should offer an **M.Tech. programme in Aquaculture Engineering** joining with CUCEK. **The products of the programme shall have the capability to address aquaculture Engineering with global perspective.**
Justification for launching the programme proposed	The enhancement of aquaculture production at national level is the need of the hour. The intensive and ecosystem-based aquaculture production systems require specialised manpower with the right mindset to develop engineering goods services to support aquaculture production systems integrating the concepts of sustainability and ecosystem needs. Therefore, specialized man power is Requiring to offer tailor made ecosystem- based engineering solutions
Other institutes offering similar programmes	IIT Kharagpur offers this programme

Expected graduate outcomes of the proposed programme	Highly specialized manpower to build, operate and provide sustainable aquaculture production systems such as RAS, Aquaponics, BFT, IMTA, open sea cages, Raceways, and ZWEAPS for sustainable aquaculture production aiming at global aquaculture industry. The Feeder course will be B.Tech or BE in Civil and Mechanical Engineering.
Partnership with Industry if any for the proposed programme	Aquaculture Industry International
Partnership with foreign universities if any for the proposed programme	Partnership needs to be developed.
Number of seats in the proposed programme (Minimum 25)	20
Proposed fees for the proposed programme	20000/semester
Additional Infrastructural requirements if any needed for the proposed programme	1. Aquaculture Engineering Production Unit 2. Aquaculture Engineering Laboratories M.Tech. in Aquaculture Engineering to be supported by NABARD, NFDB, Aquaculture Industrial Houses, partnering Countries. Faculty Associate Professor in Aquaculture Engineering - 1 (To be created) Assistant Professors in Aquaculture Engineering (2) (To be created). Board of Studies to be constituted, curriculum to be built, labs and classrooms to be set up. Specialties: The Course is oriented towards the engineering of sustainable aquaculture production systems with ecological perspective aimed at high health of the rearing stock. The programme is aimed to be commenced from the Academic Year 2024.

\PG PROGRAMME – III

Name of the Programme	M.Tech. Marine Biotechnology sponsored by The Department of Biotechnology, Government of India
Nature of the programme proposed	Revision of the existing
Mode of delivery of the programme proposed	Offline
Duration of the programme	2years
Description of the programme proposed	**The M.Tech programme in Marine Biotechnology sponsored by Department of Biotechnology, Government of India is an unique educational programme in its kind in India.** **Why M.Tech. in Marine Biotechnology?** To ignite young talented minds having strong foundation in science to take up major challenges which human race faces and to find practical solutions through marine biotechnological interventions. The challenges to be addressed are: 1. Food and nutritional security through enhancement of marine/aquatic food production through intensive aquaculture 2. Depleting fuel stock and requirement of Next generation fuel (Bio-fuel) for next generation human race 3. Climate change and need of its reversal for survival 4. Human and animal health related issues and requirement of next generation pharmaceuticals with least or no side effects. Over above three decades, Government of India has been supporting infrastructure development and research in focused areas of Marine Biotechnology to develop novel processes and products aiming at enhancement of marine biotech industrial processes, biomedical material development, environment management and intensive aquaculture production. In any such movement, appropriate manpower with the right mind set is a vital component, and to satisfy this requirement the M.Tech. programme in Marine Biotechnology has been conceptualized. The

	curriculum has been built with the global concept of education 'Find Solutions to the Human Problems in Class Rooms '. Through this programme we look forward to generate Academicians, Scientists, Technocrats, Entrepreneurs and Planners to address the above cited issues and to find appropriate solutions. The programme is offered at National Centre for Aquatic Animal Health, Cochin University of Science and Technology under the supervision of an Advisory Board having Vice Chancellor as the patron and a Placement and Biotechnology. Entrepreneurship Committee to ensure the placement of students desirous to work in Industries or provide handholding support to students desirous to start their own enterprise/start- ups under different schemes of Central/State Government, both constituted by the University as per the directives of DBT. Admission to the programme is through qualifying Graduate Aptitude Test in Biotechnology (GAT-B), conducted by the Regional Centre for Biotechnology, Faridabad on behalf of the Department of Biotechnology, Government of India. This examination is to rank the eligibility of the candidate among all applicants, and the candidates will be given a GAT-B rank based on which they may apply to M Tech. programme in Marine Biotechnology.
Justification for launching the Programme proposed	The students are currently being placed in the life science industries and research institutes
Other institutes offering similar programmes	Nil
Expected graduate outcomes of the proposed programme	The programme is developed in alignment with sustainable development goals with global concept of education- to find solutions to human problems through classrooms. The students are expected to be globally competent academicians, researcher and entrepreneurs in the realm of aquaculture and marine biotechnology.
Partnership with Industry if any for the proposed programme	There is no specific partnership. The programme is linked with Life Science Sector Skill Development Council and Agriculture Sector Skill Development Council for skill development as part of the programme.

Partnership with foreign Universities if any for the proposed programme	Nil.
Number of seats	20
Proposed fees for the proposed programme	Less than Rs,50,000 for the entire programme as the programme is fully sponsored by the Government of India
Additional Infrastructural Requirements if any needed for the proposed programme	The infrastructure requirement is one additional class room. The requirement of additional faculty positions in Systems and Computational Biology and Aquatic Animal Health have been put forth to the Department of Biotechnology for approval.

The programme will be revised for certain courses to integrate industrial applications, which will be carried out as per the vision of the Department of Biotechnology, Government of India.

Certificate and Skill Development Programmes

1. Completed certificate course: Aquatic Animal Health Management (1 course completed as part of RUSA under CUSATECH Foundation for a period of 6 months)

2. Approved DBT-Skill Vigyan Programme (Aquatic Animal Health Manager, Technician Training): Approved by DBT, Government of India and implemented through Kerala State Committee on Science, Technology and Environment.

3. Skill Development Programmes proposed under Kerala Knowledge Economy Mission

   1. Skill Development Programme in Synthetic Biology

   2. Skill Development Programme in Genetic Engineering

   3. Skill Development Programme in Aquatic Animal Health Monitoring

   4. Skill Development in Precision Aquaculture in the India context
   (Inclusive of small-scale farmers)

4. Finishing School in Marine Biotechnology for post-graduates in Marine Biotechnology

CERTIFICATION PROGRAMMES

CERTIFICATECOURSES–SKILLDEVELOPMENT

Department proposingthe programme	National Centre for Aquatic Animal Health
Name of the proposed Programme	Aquatic Animal Health Management
Nature of the programme proposed	Certification

Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	6 months
Description proposed Of the programme	This programme was conceptualized along with the establishment National Facility for Sustainable Aquaculture Production system (NaF - SAPS) (opened by Dr. J. Letha, the then Honorable Vice-Chancellor, CUSAT on 27th July 2017) at NCAAH as the outcome of Indo - US knowledge initiative sponsored by University Grants Commission, Govt. of India, New Delhi. What presented here is one of the two educational programmes envisaged to strengthen Aquaculture in the Country. **This is one of the centre's initiatives towards poverty alleviation and nutritional security through aquatic animal health management for sustainable production.** **1. Definition: Aquatic Animal Health Management:** A process of assisting aqua-farmers in the practice of sustainable aquaculture production, maintaining environmental health by applying tools and devices and biological entities eco-friendly and economically viable. **2. Challenges:** Putting together and blending of all components of aquaculture production systems in the curriculum with justification to the concept of inclusiveness of environment and maintenance of the delicate balance of nature during production integrating preventive health care. **3. Prospects:** India looks forward to doubling aquaculture production within another five years. There is a dearth of Aquatic Animal Health Managers in the business. The course envisaged here serves for sustained fish production for food and nutritional security and poverty alleviation. As far as the prospects of employability of the course are concerned the certificate. Holders will be competent to serve as Qualified Aquaculture Consultants with

	specific reference to Aquaculture System and Health Management.
Justification for launching the Programme proposed	**Expectations-Why such a programme.** Defined, Well qualified technical personnel to support farmers at field level in the implementation of sustainable aquaculture production under preventive health care mode is lacking, especially with the right mindset to be with farmers as one among them. This causes immense difficulties to farmers and the aquaculture sector as a whole, and the situation attracts pseudo-experts to dominate the scene and misguide the investors. Most of the occasions these ill-qualified persons fail to troubleshoot and solve issues practically at field levels. An **Aquatic Animal Health Manager** shall fill the gap. **A Certificate holder in Aquatic Animal Health Management programme must be capable to design and execute need-based, species and location-specific need-based, species and location-specific aquaculture production systems with sustainability having preventive health care as the strategy.**
Other institutes offering similar programmes	Nil. However, Agriculture Sector Skill Development Council is offering Skill Development Programme in Aquatic Animal Health
Expected graduate outcomes of the	A Certificate holder in Aquatic Animal Health Management programme must be capable to design and execute need-based, species and location-specific aquaculture production systems with sustainability having preventive healthcare as the strategy.
Partnership with Industry if any for the proposed programme	Aquaculture Industry
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme(Minimum 25)	20
Proposed fees for the proposed programme	Rs10000

Additional Infrastructural requirements if any needed for the proposed programme	Classrooms and aquatic animal health laboratory.

Cochin University of Science and Technology National Centre for Aquatic Animal Health

DBT-Skill Vigyan Programme

1. **Technician Training: Skill development in Aquatic Animal Health Management**

1. **Definition: Aquatic Animal Health Management:** A process of assisting aqua- farmers in the practice of sustainable aquaculture production, maintaining environmental health by applying tools and devices and biological entities of eco-friendly and economically viable.

2. **Expectations - Why such a programme.** Defined, well-qualified technical personnel to support farmers at field level in implementation of sustainable aquaculture production under preventive health care mode is lacking, especially with the right mindsetto be with farmers as one among them. This causes immense difficulties to Farmers and the aquaculture sector as a whole, and the situation attracts pseudo-experts to dominate the scene and misguide the investors. Most of the occasions these ill-qualified persons fail to troubleshoot and solve issues. *An Aquatic Animal Health Manager shall fill the gap. An Aquatic Animal Health Manager must be capable to design and execute need based, species and location specific aquaculture production systems with sustainability having preventive health care as the strategy.*

3. **Challenges:** Putting together and blending of all components of aquaculture production systems in the curriculum with justification to the concept of inclusiveness of environment and maintenance of the delicate balance of nature during production integrating preventive health care.

4. **Prospects:** India looks forward to double aquaculture production with in another five years. There is dearth of **Aquatic Animal Health Managers** in the business. Same is the situation internationally and the course envisaged here serves globally for sustained fish production for food and nutritional security.

5. **Feeder Course:** Bachelor of Aquaculture/Fisheries Science

6. **Infrastructure:** The Infrastructure available at National Centre for Aquatic Animal Health is sufficient.

7. **Faculty:** One additional faculty-Teaching Assistant

8. Duration: 12 months (6 months lab/6 months field).

Skill Development in Synthetic Biology

TEMPLATE FOR PROGRAMME FRAMEWORK

Contents in the Programme Framework	Details provided below.
Partner Institution	National Centre for Aquatic Animal Health, Cochin University of Science and Technology
Skill programme name	**Skill Development in Synthetic Biology**
Sector	Biotechnology
NSQF level	The curriculum has been developed keeping in mind the requirements of 10 Levels of National Skills Qualifications Framework (NSQF)
Job role for placement	In the R&D sector of Biotech company as Research Scientist in product development
Salary information	Rs.40-50,000.0per month
Mode of delivery	Offline
Location	National Centre for Aquatic Animal Health, Cochin University of Science and Technology
Eligibility	Postgraduate degree in Biotechnology
Course fee	Rs.15,000.0(Rupees Fifteen thousand only) per head for the three months period
Duration	Total duration: 375 hours (25 days per months x 5 hours per day 3 months) Theory: 10 hours Practical:225 hours Internship:110 hours
Industry partner	Synthite Industries Private Limited
Certification	National Centre for Aquatic Animal Health, Cochin University of Science and Technology
Number of candidate strained in a year	Five candidates for a duration of three months, three times a year(Total15)
Activation time:	Three months from the date of sanctioning the project

TEMPLATE FOR SECTOR FRAMEWORK

CONTENTS IN SECTOR FRAMEWORK	DETAILS INCLUDE
Sector/Domain Overview	Biotechnology with special reference to product development of molecules/compounds which are difficult to be extracted from natural sources because of poor partition and/or extremely small quantity or very expensive to be synthesized chemically. In this process cell factories are generated for the large-scale production of compounds of high economic value based on the synthetic circuits engineered and implanted in the former. Drugs, pharmaceuticals and specific nutrients of natural origin whose synthetic routs are fully known fall under the category. Specifically, these compounds are in nature in very small quantity economically unviable to be xtracted.
Growth and opportunities of the sector	Synthetic biology is the sunrise sector under the domain Biotech production of drugs, pharmaceuticals and nutrients. Having got firm foot hold in the west, poised to be the next generation production process in India and other developing nations for specialized organic molecules of high value opening immense job Opportunities.
Key statistics	A few Synthetic biology companies around the world 1.Ginkgo Bioworks, US, Boston 2.Agilent Technologies,China, 3.Thermo Fisher Scientific. **Indiancompanies:1.** BIOMINING INDIA PRIVATE LIMITED, Mumbai based company, **2.** BioP India is a company founded in 201, iGEM-Cambridge, England is a nonprofit organization promoting responsible innovation in the field of Synthetic Biology through competition, collaboration etc. At this stage finds almost impossible to assess/predict. The global synthetic biology market is projected to reach $30.7 billion by 2026 from $9.5 billion in 2021, at a compound annual growth rate of 26.5% during the forecast period, according to a report from MarketsandMarkets.com. Factors favoring

	the market's growth include a wide range of applications of synthetic biology, the rising R&D funding and growing initiatives in synthetic biology, the declining costs of DNA sequencing and synthesis, and the increasing investments in the market. However, biosafety, biosecurity, and ethical concerns related to synthetic biology could slow growth. At this stage very difficult to assess the contribution of Synthetic biology to GDP.
Incremental HR requirement	The global synthetic biology market is projected to reach \$30.7 billion by 2026 from\$9.5billionin2021, at a compound annual growth rate of 26.5% during the forecast period, according to a report from MarketsandMarkets.com. Factors favoring the market's growth include a wide range of applications of synthetic biology, the rising R&D funding and growing initiatives in synthetic biology, the declining costs of DNA sequencing and synthesis, and the increasing investments in the market. However, biosafety, biosecurity, and ethical concerns related to synthetic biology could slow growth. At this stage no formula is available to determine the future demand of the sector and widening of the sector in diverse field and the HR requirements for next 5 years
Career Track	Research Scientist in the R&D wing of a Biotech company who aims at synthetic biology production of naturally occurring high value products.
Technical Skills	Genomic DNA extraction, primer design, gene cluster/ operon amplification, cloning PCR products, designing Bio bricks and their synthesis, assembly, construction of synthetic circuits and implantation in Cell factories.
Core Skills	Development of Synthetic gene constructs/circuits and Implantation in cell factories and product development.
Career pathway	There is only one job role – Research Scientist in the R&D wing of a Biotech company who aims at Synthetic Biology production of naturally occurring high-value products.

SkillDevelopmentProgramme2:

Skill Development Programme in Genetic Engineering

The biotechnology industry in the country is constrained due to the lack of suitably skilled man power. Genetic engineering is a basic technique in life science industries for the recombinant production of proteins, and therefore, skill development in genetic engineering is essential to support life science industries.

1. **Title of the course:** Skill Development Programme in Genetic Engineering

2. **Objectives**: The objective of this course is to provide students with the practical knowledge and skills in genetic engineering, with the following outcome

At the end of the skill development programme, the students will be able to

1. Perform isolation and quantification of nucleic acid and proteins

2. Practice quantification of gene expression

3. Produce recombinant proteins

4. Analyze the protein of interest

SkillDevelopmentProgramme3:

Skill   Development Programme in Aquatic Animal Health Monitoring

Introduction

Health monitoring in aquatic animals is an integral part of the aquaculture practice, and it is termed as Integrated Disease Monitoring and Management (IDM and M). This process requires basic understanding on the aquaculture environment, physiology of the aquatic animals, clinical signs, pathogen involved and field level diagnostic procedures.

Objective of the course: The objective of the course is to train Bachelors Degree holders in Fishery Science or Aquaculture/Zoology with specialization in fisheries or aquaculture to develop skills in **Aquatic Animal Health Monitoring** to provide technical support for Aquaculture farmers.

Course Outcome: By undertaking the skill acquisition programme, the candidate will be able to monitor health of aquaculture environment and animals and provide suggestions to farmers for better management.

K-DISC

Skill Development in Aquatic Animal Health Management

TEMPLATE FOR PROGRAMME FRAMEWORK

Contents in the Programme Framework	Details to be included
Partner Institution	National Centre for Aquatic Animal Health, Cochin University of Science and Technology
Skills programme name	**Skill Development in Aquatic Animal Health Management**
Sector	Aquaculture
NSQF level	The curriculum has been developed keeping in mind the requirements of 10 Levels of National Skills Qualifications Framework (NSQF).
Job role for placement	Self-employment as free-lance Aquatic Animal Health Manager at field level, to be /hired/employed by finfish and shellfish hatchery complexes, brood stock development Centres, corporate houses in aquaculture, High density fish production centres, manufacturers of aquatic animal health products
Salary information	Rs. 30-40,000.0 per month
Mode of delivery	Offline
Location	National Centre for Aquatic Animal Health, Cochin University of Science and Technology
Eligibility	Graduate degree in aquaculture or postgraduate in Zoology with Aquaculture/Fisheries as specialization
Course fee	Rs.15,000.0(Rupees Fifteen thousand only) per head For the three months period
Duration	Total duration:375hours (25days per months x 5hours per day 3 months) Theory: 10 hours Practical:225hours (Inclusive of field visits) Internship: 110 hours
Industry partner	Not specified
Certification	National Centre for Aquatic Animal Health, Cochin University of Science and Technology
Number of candidates trained in a year	5 for a duration of three months, three times a year (Total 15)
Activation time:	Three months from the date of sanctioning the project

CONTENTS IN SECTOR FRAMEWORK	DETAILS INCLUDE
Sector/Domain Overview	Domain – Aquaculture (Finfish, Crustaceans and Molluscs): Brood stock development centres, seed Production centres, grow outs of different category of innumerable species, diagnostic laboratories.
Growth and opportunities of the sector	Aquaculture is the hope for food and nutritional security in the millennium. There is ever increasing demand for fish protein and concomitant to which there is expansion and intensification of the aquaculture practices. This human endeavour, if not scientifically blended with the laws of nature, will lead to emergence of diseases. The group trained under this programme will have the knowledge base and technical skill to monitor health of an aquatic system, the aquatic animals in the system and help regulate the production process avoiding diseases episodes, and in case there is an outbreak would be able to offer solutions.
Key statistics	The baseline statistics is that for every 100 farmer having less than one-hectare water spread area, and every 5 seed production centres having 1 million each capacity must be requiring one such technical personnel.
Incremental HR requirement	Unpredictable as such Technical personnel must be getting hired or appointed by the private sector. This requires creation of awareness in the stakeholders the benefit of having such skilled manpower with them.
Career Track	Aquatic Animal Health Manager in the aquaculture domain would be able to streamline the production Process without diseases occurrence.
Technical Skills	Aquaculture environment monitoring, operation and maintenance of aquaculture systems, disease monitoring at field level, primary diagnosis at field level, second level And third level diagnosis at laboratory level, preventive health care and therapy

Core Skills	Offering holistic monitoring aquatic environment and
	Aquatic animal health and offering solutions at preventive And curative level.
Career pathway	Freelance Aquatic Animal Health Manager who can serve in all spheres of aquatic protein production starting from pond preparation to harvest.

Skill Development Programme 4:

Skill Development in Precision Aquaculture in the India context

(Inclusive of small scale farmers)

Introduction

Precision aquaculture focuses on utilizing modern technologies towards the ***eco-intensification*** of aquaculture farms. The overarching aims of precision aquaculture have been defined as 1) improve accuracy, precision and repeatability in farming operations; 2) facilitate more autonomous and Continuous biomass/animal monitoring;
3) provide more reliable decision support and; 4) reduce subjectivity and improve performance. Similar to precision *livestock* farming, precision *fish* farming has been decomposed into three conditions that must be fulfilled. The basic requirements of precision aquaculture are: A. Continuous monitoring of animal variables (i.e. parameters related to the behavioural or physiological state of the fish), B. a reliable model to predict how animal variables dynamically vary in response to external factors, and, C. observations and predictions integrated into an on-line system for decision or control. **The attempt is not to replace human endeavour and involvement with machines, but to assist human resource to make the output sharper and faster. In Indian context every activity must be human-centric, so as to find employment to the multitudes. Any investment in human resource will catalyze the economy.**
K-DISC

Skill Development in Precision Aquaculture in the Indian Context

TEMPLATE FOR PROGRAMME FRAMEWORK

Contents in the Programme Framework	Details to be included
Partner Institution	National Centre for Aquatic Animal Health, Cochin University of Science and Technology
Skill programme name	Skill Development in Precision Aquaculture in the Indian Context
Sector	Aquaculture

NSQF level	The curriculum has been developed keeping in mind the requirements of 10 Levels of National Skills Qualifications Framework (NSQF).
Job role for placement	Self-employment as free-lance **Consultant in Precision Aquaculture** at field level, to be/ hired/ employed by finfish and shellfish hatchery complexes, brood stock development Centres, corporate houses in aquaculture, high-density fish production centres, manufacturers of Aquatic animal health products.
Salary information	Rs. 30-40,000.0 per month
Mode of delivery	Offline
Location	National Centre for Aquatic Animal Health, Cochin University of Science and Technology
Eligibility	Graduate degree in Aquaculture or postgraduate in Zoology with Aquaculture/Fisheries as specialization
Course fee	Rs.15,000.0 (Rupees Fifteen thousand only) per head For the three months period
Duration	Total duration: 375 hours (25 days per months x 5 hours Per day 3 months) Theory: 10 hours Practical:225 hours (Inclusive of field visits) Internship: 110 hours
Industry partner	Not specified
Certification	National Centre for Aquatic Animal Health, Cochin University of Science and Technology
Number of candidates trained in a year	Five for a duration of three months, three times a year (Total 15)
Activation time:	Three months from the date of sanctioning the project

TEMPLATE FOR SECTOR FRAMEWORK

CONTENTS IN SECTOR FRAMEWORK	DETAILS INCLUDE
Sector/Domain Overview	Domain – Aquaculture (Finfish, Crustaceans and Molluscs): Broodstock development centres, seed production centres, grow outs of different category of innumerable species, diagnostic laboratories.

Growth and opportunities of the sector	Aquaculture is the hope for food and nutritional security in the millennium. There is ever increasing demand for fish protein and concomitant to which there is expansion and intensification of the aquaculture practices. In this human endeavour, there are the requirements of utilization of modern technologies for the eco-intensification of aquaculture farms. The group trained under this programme will have the knowledge base and technical skill to support the investors by providing the tools and devices and procedures for monitoring the system and help regulate the production process avoiding losses at various levels due to diseases and system collapse.
Key statistics	The baseline statistics is that for every 100 farmer having not less than one hectare water spread area, and every 5 seed production centres having 1 million each capacity Must be requiring one such technical personnel.
Incremental HR requirement	Unpredictable, as such Technical personnel must be getting hired or appointed by the private sector and/or they can serve as free-lance Consultants in precision aquaculture. This requires creation of awareness in the stakeholders the benefit of having such skilled manpower with them.
Career Track	Consultants in precision aquaculture in the aquaculture Domain who would be able to streamline the production process.
Technical Skills	Aquaculture environment monitoring (Physical, Chemical and biological), carrying capacity determinations, bioremediation for maintaining and enhancing carrying capacity of an aquaculture system & application of gut probiotics to maintain intestinal health, high-density fish culture.
Core Skills	1. Improve accuracy, precision and repeat ability in farming operations; 2. Facilitate more autonomous and continuous biomass/animal monitoring; 3. Provide more reliable decision support and 4. Reduce subjectivity and improve performance.
Career pathway	Freelance Consultant in Precision Aquaculture can serve in all spheres of aquatic protein production starting from pond preparation to harvest.

2.21 DEPARTMENT OF PHYSICAL OCEANOGRAPHY

CERTIFICATION COURSE – I

Name of the proposed Programme	Coastal Ocean Modelling
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed (Offline/Online)	Offline/Online
Duration of the programme proposed	30 hours
Description of the programme proposed	The short-term course "Coastal Ocean Modelling" provides a theoretical aspect of ocean modelling and a hands-on experience on MIKE/ DELFT 3D The trainers will include faculties from CUSAT and trainers from DHI. (To be confirmed) The course objectives are: • Fundamentals of Ocean dynamics. • Numerical methods for solving Partial Differential Equations. • Installation and set up of model. • Modelling and simulation of sea level and tidal circulation of coastal oceans using two-dimensional model. • Modelling and simulation of three-dimensional coastal oceanographic processes. • Model calibration and validation.
Justification for launching the programme proposed	Oceans are huge water bodies on Earth, making it habitable for humans and other organisms. Oceans are great resources of freshwater, minerals, fishery and control the weather and climate of Earth. Understanding the oceans and their prediction are crucial to keep the ocean healthy and assess the ocean's impact on humans. Ocean modelling is an activity of predicting the ocean state by solving the dynamical equations governing fluid motion and its properties. Ocean models enable us to predict the future state of the oceans and allow to make experiments that are impractical in reality. Coastal oceans are part of the oceans that are close to the mainland and influence human activity in different ways. Coastal pollution, coastal erosion, over-exploitation of fishing resources and sea level rise are some of the issues of coastal communities. Hence, modeling is an important tool to understand and manage the oceans.

	There are several model software available to study the oceans. Many open-source models are difficult to manage due to their lack of support and complicated coding structure. In comparison, commercial models, though expensive, are easier to set up and run and provide support. The 'MIKE' ocean model, developed by DHI, Netherlands, is a commercial model software package used to study coastal oceanographic features. This programme will be best suited for • Students who want to learn modeling by doing modeling exercises in their curriculum. • Scholars who study coastal oceanographic problems as their research topics. • Consultancy groups that provide scientific advice to industries and Governments.
Other institutes offering similar programmes	DHI, New Delhi offers training in the Mike model. (Discussions going on).
Expected graduate outcomes of the proposed programme	It will provide the basic concepts of ocean modeling and help the graduates to do modelling related project work. It will also benefit scholars who do research in coastal oceanography.
Partnership with Industry if any for the proposed programme	DHI, New Delhi.
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs 20,000
Additional Infrastructural requirements if any needed for the proposed programme	25 High-end computers.

CERTIFICATION COURSE- II

Name of the proposed Programme	GIS in Oceanography
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online/ Offline

Duration of the programme proposed	30 hours

Description of the programme proposed	The certification programme titled "GIS in Oceanography" helps in scientifically exploring and solving the complexities in oceanography. Which will focus on oceanographic database creation by using GIS, the Generation of thematic layers connected to the ocean and its various applications. Which includes coastal zone database creation from satellite data and analysis for assessment of change detection. Participants will get trained in Arc/GIS-based cartographic mapping and processes related to Oceanography.
	
	The objectives of the programme include,
	  1. To study the basics of GIS.
	  2. Spatial data processing for GIS analysis in Oceanography.
	  3. To develop skills in coastal zone habitat mapping, data acquisition and integration in Oceanography.
	  4. Identify the major coastal zone resources.

Justification for launching the programme proposed	Participants would be able to gather spatial information collected using a wide variety of ocean-sensing instruments, such as satellites, buoys, and other devices from the concerned archives. They are trained to generate a multi-layered thematic map. The programme will be best suited for • Researchers who want to enhance their knowledge and skills in GIS applications in oceanography. • Anyone in the Industry, as well as in Scientific Organisations who want to develop or enhance their knowledge and skills in GIS/Oceanography
Other institutes offering similar programmes	Nil
Expected graduate outcomes of the proposed programme	Nowadays there are demands for the private sector to generate cartographic maps for the exploration of resources related to oceanography. Which would enhance the career opportunities of fresh graduates and also help working professionals to enhance their knowledge.
Partnership with Industry if any for the proposed programme	Nanson Research Centre (India-NERCI).
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme	25

(Minimum 25)	
Proposed fees for the programme	Rs 20, 000
Additional Infrastructural requirements if any needed for the proposed programme	Nil

CERTIFICATION COURSE-3

Name of the proposed Programme	Climate Data Analytics
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online/offline
Duration of the programme proposed	30 hours
Description of the programme proposed	The certificate program proposed here will train in visualization/analysis software such as Ferret, python, R, and Grads to generate graphs and maps of oceanographic and meteorological data (Salinity, temperature, current velocity, mixed layer depth, winds, sea level etc.).
Justification for launching the programme proposed	There is an increased demand for skilled manpower in possessing Ocean Atmospheric data. Tools for data analysis are essential for improving our comprehension of climate science. These tools are crucial for academicians and scientists to use in understanding global climate patterns. Tools for data analysis make it possible to spot patterns, correlations, and anomalies that could otherwise go undetected, whether the research is being done on temperature records, ocean currents, greenhouse gas concentrations, or satellite imagery. Additionally, they encourage interdisciplinary relations in climate research by facilitating data integration from multiple sources. In conclusion, data analysis techniques are critical for developing successful climate policy, making decisions, and reducing climate change related impacts. This course deals with the open-source tools such as Python, Ferret, R, Octave, and Grads. The programme will be best suited for • Postgraduate students in Oceanography, Meteorology, Geophysics and other marine science subjects. • Anyone who wants to develop or enhance their skills in climate data analysis. • Anyone working/looking for jobs in R&D institutions related to earth system sciences.

Other institutes offering similar programmes	NIL
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of fresh graduates in oceanography, meteorology, geophysics and other marine science subjects by enhancing their skill in using the latest data analysis and visualisation tools for handling big data used in climate science.
Partnership with Industry if any for the proposed programme	Project Management Institute (PMI)
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs 25000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

MOOC COURSE

Name of the proposed programme	PYTHON FOR OCEANOGRAPHIC APPLICATIONS
Nature of the programme proposed	MOOC
Mode of delivery of the programme proposed.	Online
Duration of the programme proposed	4 months
Description of the programme proposed.	Oceanographic research involves the analysis of data on oceans. The data comes from different sources such as in-situ observations, satellites, models and reanalysis products. A good skill in analyzing data is required for doing research work in the field of oceanography. Computer programming is a tool to process data. Among various computer programming languages, Python is an important language due to its functionalities in handling data. In this course, the student will learn the fundamentals of Python programming and also the various libraries (Python modules) for data processing.
Justification for launching the programme proposed.	Python computer programming language is the most preferred one in the market due to its huge library resources and its interactive nature. Python has applications in web and internet development, scientific

	analysis, GUI development, Data science, Artificial Intelligence and Machine Learning etc. Students who wish to learn Python fundamentals and also those who want to learn Python libraries for oceanographic applications can seek admission to the course.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	This course benefits anyone who wishes to learn Python fundamentals. It also provides analytical tools to process oceanographic data to those who do research in the field of Oceanography.
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	
Proposed fees for the proposed programme	
Additional Infrastructural requirements if any needed for the proposed programme	No

2.22 DEPARTMENT OF PHYSICS

PG PROGRAMME

Names of the Proposed Programme	1. MSc Physics - Industrial Track
	  . Condensed Matter Science
	  A. Computational Science
	    MSc Physics - Graduate Track
	  . Experimental Physics
	  A. Theoretical and Computational Physics

Nature of the programme proposed	Regular Post Graduate degree
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	2 years
Description of the programme proposed	All students will have four common foundational physics courses and one lab in the first semester. All students who pursue 1A will take courses related to relevant industries and extensive lab training in the second semester and then take up 1 year industry internship. All students who pursue 1B will take courses and lab related to computation in the second semester and then take up 1 year industry internship. All students who pursue 2A and 2B will take up a second semester of advanced foundational physics courses and thereafter a set of elective courses in the third semester followed by a 6 month project in the final semester. 1A and 1B can be started after signing MOUs with industry partners in specific area like Optics & Coatings, Nanomaterials, Semiconductor Devices, Sensors, computing, data analytics, artificial intelligence, etc.
Justification for launching the programme proposed	The revamped structure of the MSc program aims to cater to the diverse career ambitions of the students. Currently the program content of MSc Physics is oriented towards helping student to build a career in Physics research. While it is highly successful in helping a large section of the students in realizing their dream, a section of the students wants to/have to pursue career options other than going for a PhD after MSc. The proposed structure will provide students the option of pursuing a career either in scientific research and teaching or in industry related jobs and bring balance to the program.
Other institutes offering similar programmes	University of Illinois Urbana Champaign
Expected graduate outcomes of the proposed programme	Increased career options and job opportunities for students completing MSc. Overall increase in quality of the program.
Partnership with Industry if any for the proposed	For 1A and 1B tracks, it is imperative to have Industry partnerships and MOUs which will enable the students to

programme	do industry internships.
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	The total number of seats will be capped at 35. Out this, 15 seats will be for students coming from Integrated MSc stream and the other 20 will be for students coming after completing 3 years of Bachelor in Physics. The overall structure will be in line with the proposed structure of 4 year graduation and adopted 5 year integrated programme with various exit options.
Proposed fees for the programme	Rs. 50,000/- per semester for four semesters for tracks 1A and 1B. Rs. 15,000/- per semester for four semesters for tracks 2A and 2B.
Additional Infrastructural requirements if any needed for the proposed programme	Two additional labs (including one computer lab) for starting 1A and 1B. Modern lab instruments and equipment for starting 1A. Fifteen computers with power backup facility for starting 1B. Four Smart boards and furniture.

CERTIFICATION COURSE

Name of the proposed Programme	Certificate Course in "Astronomy, Sky watching and Astrophotography"
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid – Online and offline
Duration of the programme proposed	30 hours
Description of the programme proposed	The programme is targeted at the general public and enthusiasts in astronomy and sky watching. The program will cover Conceptual details of the Astronomy, the essentials of observational astronomy and Astro photography. Welcome kit A one night sky observation tour to a remote area or observatory
Justification for launching the programme proposed	We have been receiving many requests courses on astronomy. We have the faculty who have expertise in this area and have been doing outreach programs on this topic for the past many years. We have an 8-inch astronomical telescope in the department.
Other institutes offering similar programmes	There was some private course on "Amateur Astronomy" which is not there.
Expected graduate outcomes of the proposed programme	Knowledge and skill and hobby training.

Partnership with Industry if any for the proposed programme	NA
Partnership with foreign universities if any for the proposed programme	NA
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs 25000
Additional Infrastructural requirements if any needed for the proposed programme	We will need to procure the following 1. High-definition camera to attach with the telescope 2. Higher resolution Telescope

The proposed program is the initial one from the pool of certificate programs we have been preparing at the department. The list of courses planned for future are,

- Essential Computational and soft skills for science under graduates/ teachers/public
- AI based modelling in physics for students and teachers
- Statistical techniques for early-stage researchers
- Analytical techniques for material science researchers

MOOC COURSE

Name of the proposed Programme	MOOC Course in "Quantum Computing"
Nature of the programme proposed	Certificate course / Elective course
Mode of delivery of the programme proposed	Offline / Hybrid
Duration of the programme proposed	4 credit course
Description of the programme proposed	Theoretical understanding and state of the art in quantum computing and its applications
Justification for launching the programme proposed	We have offered this course as elective for the MSc. In physics. Some of the students who have done this course have also got jobs in startup who are working in quantum computing. Students from within the university, students from other universities and IT industry may show interest in the course.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	Theoretical understanding and state of the art in quantum computing and its applications.
Partnership with Industry if any for the proposed programme	

Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	As per the university norms
Additional Infrastructural requirements if any needed for the proposed programme	

2.23 DEPARTMENT OF POLYMER SCIENCE AND RUBBER TECHNOLOGY

PG PROGRAMME- I

Name of the proposed Programme	B.Tech-MBA Integrated programme in Polymer Engineering and Management (interdepartmental programme with School of Management Studies, CUSAT)
Nature of the programme proposed	New degree
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	5 years
Description of the programme proposed	The course combines the studies of Bachelor of Technology (B.Tech) and Master of Business Administration (MBA) courses. Students acquire both technical and management skills and knowledge through this course. **Highlights of the course:** 1. The programme consists of 10 semesters, where first 7 semesters cover the B.Tech syllabus and 8th semester will be a full time Project (for exit students)/3 course work along with project (for the B.Tech-MBA students) at any industry/R&D centre/academic institute. 2. The Aspirants who wish to have the B.Tech degree alone can exit after completing the 8th semester; and those who wish to get MBA along with B.Tech can continue 9th and 10th semesters. 3. For the B.Tech + MBA integrated programme, the syllabus consists of Management courses starting from their sixth semester. In the eighth semester they will have 3 management theory courses along with their project. The final two semesters focus on management courses alone and this will be conducted at School of Management Studies (SMS), CUSAT. 4. The students can earn Integrated B.Tech.-MBA degree from CUSAT, one of the most reputed universities in the country. 5. The classes will be handled by the best of academicians and Practitioners. 6. The programme uses a Continuous Evaluation System that assesses the learners over convenient and regular intervals. 7. Fee structure is the lowest when compared to other

	Universities or Institutes providing the B.Tech + MBA integrated programmes.
Justification for launching the programme proposed	B.Tech + MBA Integrated Course is a 5-year long course. B.Tech is a 4-year degree course whereas MBA is a 2-year degree course. Students who pursue them individually will have to spend 6 years in order to complete the courses. B.Tech + MBA integrated course allows students to complete UG degree in engineering + PG degree in management in 5 years. The candidate with the dual degree will have the upper hand over the other candidates. The B.Tech + MBA program will enable engineers to work in a more organized manner in any industries. **Admission criteria:** - Minimum 50% marks in 10+2 exams with Physics, Chemistry and Mathematics, and a minimum 50% marks in the class 12th Mathematics and (Physics+Chemistry+ Mathematics) exams. - Candidates must appear in Cochin University national-level entrance exam (CUSAT-CAT). This programme is perfect for job profiles like production managers, program managers etc. There are many opportunities in both public and private sectors for the students after finishing B.Tech + MBA program. As the graduates hold both technical and managerial skills and knowledge, they can excel in any sector.
Other institutes offering similar programmes	IIT Kanpur (Rs.1031242/-), IIT Madras (Rs. 1700000/-), ABV IITM Gwalior (Rs. 800000/-), Amity University, Delhi (Rs. 16,60,000/-), IIT Roorkee (Rs. 1200000/-)
Expected graduate outcomes of the proposed programme	B.Tech + MBA Syllabus combines the best of both degrees. The career opportunities for B.Tech + MBA graduates are quite lucrative and dynamic. In B.Tech + MBA, students learn about engineering principles, business concepts, and management theories. A lot of professionals go for MBA after completing B.Tech. After completing the course, individuals can handle managerial positions in multiple fields like technology, manufacturing, and consulting. Expected outcomes: - Students will gain a strong understanding of both engineering and management principles. - Students will develop the skills and knowledge necessary to succeed in a variety of industries. - Students will have the opportunity to network with professionals in engineering and management.

	• Students will be well-prepared for a challenging and rewarding career. • Students will acquire technical as well as managerial skills to became entrepreneurs
Partnership with Industry if any for the proposed programme	If possible
Partnership with foreign universities if any for the proposed programme	If possible
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	$30,000 \times 8 + 50000 \times 2 = 340000$/-
Additional Infrastructural requirements if any needed for the proposed programme	5 class rooms 2 Labs Faculty rooms Toilet Facilities 2 Sick rooms (gents and ladies) 1 Records room (for keeping office records) Power back up and UPS room Computer room with 30 computers

PG PROGRAMME-2

Name of the proposed Programme	M. Tech in Materials Science and Nano Engineering
Nature of the programme proposed	New degree
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	2 Years
Description of the programme proposed	Materials Science and Nano Engineering course is an interdisciplinary field of science and engineering which investigates the relationship between the structures, property and processing of materials useful to invent new devices and systems, and translate them to useful technologies. This programme will mould the students by throwing insights on significance of materials and nanoengineering to serve the world with their innovative ideas. Through this course, the students able to develop materials for new applications, improve existing materials to enhance performance and evaluate ways in which different materials can be used together. Nano Engineering is helping to considerably improve, even revolutionize, many technology and industry sectors: transportation, energy, food safety, security, medicine, and environmental

	science, among many others.
	Objectives & Learning outcomes
	Through the materials science and nanoengineering programme, the faculties will guide the students to become an entrepreneur, installing research developments (R&D), startups with new ideas that providing employment.
	- The M.Tech degree is designed in a way to provide a holistic view on all the classes of materials including metals, ceramics and polymers. - The program is intended to provide in-depth knowledge in the fundamentals, analysis and structure-property correlation of various materials. - Combines theory and simulation with experiments, and use fundamentals to solve practical problems. - Developing students' presentation and writing skill by giving seminars, writing research and review articles, book chapters, Editing books etc.
	Highlights of the course
	1. This M. Tech programme consists of four semesters, whereas first 2 semesters will be offering theory papers with electives combined with laboratory experiments. The final year will be a full time project at research institute, R&D or industry (3rd semester two elective papers will offer in online mode.)
	2. Provides exposure by attending internship and project at foreign Universities and R&Ds.
	3. The classes will be handled by the best of academicians and practitioners from industry.
	4. The programme uses a Continuous Evaluation System that assesses the learners over convenient and regular intervals.
Justification for launching the programme proposed	M. Tech in materials science and nano engineering is a PG programme at CUSAT would be collaborated with affiliated centres and Institutes nationally/ internationally.
	Through this programme, MOU will be signed with various Universities over nationally/internationally.
	MOU make the students to get exposure in research by attending any exchange/visiting program.
	1. M. Tech graduates can seek employment include production including automobile, paint industries, adhesives industries, electronic industries, textile, biotechnology, agriculture, food, genetics, pharma, space research, medicine and so on
	2. This supports the students morally, scientifically and financially.
	3. Eventually, through this M. Tech programme successful graduates will own their identity, have their dream/vision and endup with self -motivation

	that make to achieve their target.
	Admission criteria:
	• B. Tech in Polymer Engineering/ Mechanical Engineering/ Materials Engineering, Chemical Engineering, Ceramic Technology, Fiber Science/Technology, Civil Engineering, Electrical Engineering, M.Sc Materials Science, M.Sc Chemistry and M.Sc Physics
	• Admission through GATE/ CUSAT-DAT
Other institutes offering similar programmes	Rice University, USA, IIT Patna, IIT Kanpur, IIT Delhi, IIT Kharagpur
Expected graduate outcomes of the proposed programme	M. Tech graduates can pursue employment include energy storage and harvesting, biotechnology, agriculture, food, genetics, space research, medicine and so on. This programme offers ample opportunities in both industrial, academic field and R&Ds.
Partnership with Industry if any for the proposed programme	If possible
Partnership with foreign universities if any for the proposed programme	If possible (under discussion)
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs 1,20,000/-
Additional Infrastructural requirements if any needed for the proposed programme	1 Class room 1 Lab 1 Computer lab with 30 computers Faculty rooms Toilet Facilities 2 Sick rooms (gents and ladies) 1 Records room (for keeping office records) Power back up and UP room

CERTIFICATION COURSE

Name of the proposed Programme	Certification programme on Rubber product design, processing and testing
Nature of the programme proposed	Certification Programme
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	6 months
Description of the programme proposed	This certification programme entitled 'Certification programme on rubber product design, processing and testing' is a comprehensive programme to impart basic as well as applied knowledge on rubber compounding,

	processing, product design and manufacture and testing using both Natural and synthetic Rubbers. They will acquire the knowledge on various rubbers and compounding ingredients, formulation and product design and rubber processing and testing. They will also learn trouble shooting of common problems encountered during the rubber compounding and product manufacture. The participants would also learn about the various quality control testing protocols and the standards followed for the quality assurance. This will benefit themselves as well as their organization.
Justification for launching the programme proposed	Employees who work in this field, who wants to seek job in this sector, who wants to begin small scale industry would benefit from this course. Further, candidates who complete this course would find job in rubber industries. Admission Criteria: B.Sc Chemistry, Physics, Polymer Chemistry, Diploma in Polymer Technology, Mechanical Engineering, Chemical Engineering.
Other institutes offering similar programmes	Rubber Research Institute of India
Expected graduate outcomes of the proposed programme	
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs. 30000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

SKILL DEVELOPMENT PROGRAMME

Name of the proposed Programme	Dry Rubber/Latex Processing and Testing
Nature of the programme proposed	Skill Development Programme
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	100 h (30 h Theory + 70 h Practicals) (1 month)

Description of the programme proposed	The Skill Development Programme titled "Dry Rubber/Latex processing and testing" is a comprehensive introduction to various processing methods using Natural Rubber latex and dry natural rubber. The participants will learn about rubber compounding of latex and dry rubber. They will acquire the skill to prepare rubber formulations and rubber or latex products. They will also learn and in hands experience on various testing methods for latex and dry rubber products. This will enable to get good skill in compound design and raw materials and product testing, benefitting themselves as well as their organization. Industrial Visits will be scheduled as part of this programme to equip them with better understanding of the rubber processing and product manufacturing.
Justification for launching the programme proposed	Solid understanding on the basics of the subject and testing protocols complementing with manufacturing techniques would equip the candidates to be better performers for their organization. Further candidates who complete this skill development course would find job opportunities in latex/rubber industries. This will facilitate the students to be Lab Chemists or Technicians in Rubber / Latex Industry. Admission Criteria: Plus Two, Diploma, ITI
Other institutes offering similar programmes	National Institute of Rubber Training is offering 3 day training programme.
Expected graduate outcomes of the proposed programme	Lab Chemist/ Technician in Rubber / Latex Industry
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs. 10000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.24 SCHOOL OF ENGINEERING (SOE)

2.24.1 DIVISION OF CIVIL ENGINEERING

CERTIFICATION COURSE-I

Department proposing the programme	Civil Engineering
Name of the proposed Programme	BIM for Civil Engineers
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	36 Hours
Description of the programme proposed	**BIM**- a **3D CAD Modelling Technique** has helped the industry pick up the pace with fast-pacing real estate. Sometimes when you're making a building design or any infrastructural design the possibility of errors is a million and realising some of the mistakes could be very late as the structure would have been already standing by then. Any small miscalculation or errors in the data or measurement recorded during the infrastructure's pre-construction stage or the architecture's designing phase could lead to major accident or incident. This course contains Architectural modelling, Estimation, Documentation, Multi-Disciplinary Coordination, Structural Modelling, Project Management, 4D simulation, Clash Detection, BIM 360. Softwares Learning: Autodesk Revit, Naviswork, Primavera, BIM 360. The syllabus is designed in a way that after each module there will be assessments.
Justification for launching the programme proposed	Given the present scenario of the world, infrastructure development is too much in demand. The high real estate development seeks the high requirement of civil engineers and other skilled architectural labourers. Sometimes in the fast-paced industry, it becomes hard for the building companies to quickly pull out project details and presentations. The business information modelling system dismantles the complexity of modern-day infrastructural projects. It helps in reducing errors caused by frequent human alterations. Since automation and calculation

	become machinery the chances of errors caused by constantly deviating the human mind decreases.
Other institutes offering similar programmes	IITs conduct regular workshops for BIM. APJ Abdul Kalam University (KTU) is having BIM in their Curriculam
Expected graduate outcomes of the proposed programme	• Graduates will be enabled to apply under Job Designation as BIM Modeller. • Career growth in BIM:BIM modeller, BIM Coordinator, BIM Consultant, BIM Manager, Director/VP
Partnership with Industry if any for the proposed programme	BIM Studio- A BIM company in Trivandrum, Technopark, which deals with BIM projects from overseas.
Partnership with foreign universities if any for the proposed programme	Certificates for Autodesk Software will be issued by Autodesk which is having international value (Parent company certification.
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	15,000/-Per Head
Additional Infrastructural requirements if any needed for the proposed programme	Minimum System Requirements: i3/i5 Processor, 8GB RAM, 2GB Graphics Card, 256 SSD, Windows 10 or above.

2.24.2 DIVISION OF COMPUTER SCIENCE

<u>**CERTIFICATION COURSE-I**</u>

Department proposing the programme	Division of Computer Science, SOE
Name of the proposed Programme	Artificial Intelligence and Machine Learning for Students
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	720 hours
Description of the programme proposed	The programme aims to help students gain practical knowledge and accelerate entry into the roles of Artificial Intelligence/ Machine Learning Scientist, Computer

	Scientist AIML, Data Scientist, Machine Learning Engineer, Robotics Scientist, Business Intelligence Developer and AI Research Scientist. This project (internship)-based and multi-skill course will provide structured and unstructured data to solve critical business problems with machine learning and deep learning.
Justification for launching the programme proposed	Launching a course on artificial intelligence and machine learning for students through ASAP addresses the demands of the modern job market, equips students with valuable skills, and promotes educational excellence. It also fosters innovation and interdisciplinary learning, preparing students for a technology-driven future. The program is beneficial for the Ongoing students, preferably in Science, CS, IT and EC streams
Other institutes offering similar programmes	IIT Palakkad
Expected graduate outcomes of the proposed programme	The graduates of this course on Artificial Intelligence (AI) and Machine Learning (ML) for students can expect to achieve a range of valuable outcomes. 1. **Technical Proficiency**: Graduates should have a strong understanding of the core concepts and techniques in AI and ML. This includes knowledge of algorithms, data preprocessing, model building, and evaluation. 2. **Programming Skills**: Proficiency in programming languages commonly used in AI and ML, such as Python, is expected. Graduates should be able to write code to implement AI and ML algorithms. 3. **Data Handling and Preprocessing**: Graduates should be able to collect, clean, and preprocess data for use in AI and ML applications. 4. **Machine Learning Models**: Knowledge of different types of ML models, such as regression, classification, clustering, and deep learning, and the ability to choose the right model for a given problem. 5. **Hands-On Project Experience**: Graduates should have practical experience through hands-on projects that apply AI and ML techniques to real-world problems. This includes project planning, data acquisition, model development, and result interpretation. 6. **Data Visualization**: Proficiency in data visualization tools and techniques to effectively communicate results and insights to a non-technical audience. 7. **Ethical Awareness**: An understanding of ethical considerations in AI and ML, including issues related to bias, fairness, transparency, and privacy. 8. **Problem-Solving Skills**: Graduates should have enhanced problem-solving skills, including the ability

to identify opportunities where AI and ML can be applied to address real-world challenges.

9. **Job Readiness**: Preparedness to enter the job market with the skills and knowledge needed to secure positions related to AI and ML, such as data analyst, machine learning engineer, or AI researcher.

10. **Certification**: Successful completion of the program and attainment of a certification, which can be used to demonstrate their competence to potential employers.

11. **Lifelong Learning Skills**: An appreciation for the importance of continuous learning in the fast-evolving field of AI and ML, and the ability to stay current with emerging trends and technologies.

12. **Collaborative and Communication Skills**: The ability to work effectively in teams, as well as communicate complex technical concepts to non-technical stakeholders.

13. **Research Skills**: In some cases, the program may equip students with basic research skills, allowing them to contribute to ongoing AI and ML research.

14. **Career Advancement**: The certification course can serve as a stepping stone for career advancement, either by helping students secure entry-level AI and ML positions or by enhancing their existing career prospects in related fields.

15. **Entrepreneurial Opportunities**: Graduates may be empowered to explore entrepreneurial opportunities, creating AI-based products, services, or startups.

These expected outcomes ensure that graduates of the certification course are well-prepared to contribute to the application of AI and ML in various domains, both in the job market and in innovative projects. The specific outcomes may vary based on the program's depth and focus.

Partnership with Industry if any for the proposed programme	ASAP (Additional Skill Acquisition Program)
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	Rs.40000/-
Additional Infrastructural requirements if any needed for the proposed programme	

CERTIFICATION COURSE-II

Department proposing the programme	Division of Computer Science, SOE
Name of the proposed Programme	Internship Program on Deep Learning using python for Outside students
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	Two weeks
Description of the programme proposed	This program is designed to provide students with a comprehensive understanding of deep learning techniques and practical hands-on experience with Python. The primary objective of this internship program is to empower college students with knowledge and skills in the field of deep learning, one of the most sought-after domains in artificial intelligence. By the end of the program, participants will be proficient in developing and implementing deep learning models using Python and various deep learning frameworks.
Justification for launching the programme proposed	**Program Highlights:** 1. **In-Depth Learning Modules:** The program will cover fundamental concepts of deep learning, neural networks, convolutional neural networks (CNNs), recurrent neural networks (RNNs), and advanced topics such as generative adversarial networks (GANs) and natural language processing (NLP). 2. **Hands-On Experience:** Participants will have the opportunity to work on real-world deep learning projects, including image recognition, text generation, and more. 3. **Python Programming:** The internship will focus on using Python for deep learning. Participants will learn how to work with popular deep learning libraries like TensorFlow and PyTorch. 4. **Expert Guidance:** Our team of experienced deep learning experts will mentor and guide the students throughout the program. 5. **Project Showcase:** At the end of the internship, students will showcase their projects and receive a certificate of completion. **Benefits for Students:** • Gain practical experience in the rapidly growing field of deep learning. • Develop a valuable skill set that is in high demand in the job market.

	• Network with industry professionals and fellow students. • Enhance their resumes and academic profiles. **Eligibility:** Open to College students pursuing degrees in computer science, engineering, data science, or related fields.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	What kind of career opportunities for participants if they successfully complete the course
Partnership with Industry if any for the proposed programme	
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	5000
Additional Infrastructural requirements if any needed for the proposed programme	

CERTIFICATION COURSE-III

Department proposing the programme	Division of Computer Science, SOE
Name of the proposed Programme	Data Science and Applications
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	3 Months
Description of the programme proposed	The course is based on a collaborative initiative between Cochin University of Science and Technology and Tata Consultancy Services (TCS) to offer a comprehensive three-month course on "Data Science and Applications." This course is designed to equip participants with the knowledge and skills required to excel in the dynamic field of data science and its various applications. The primary objectives of this course are as follows: To provide in-depth knowledge of data science concepts, techniques, and methodologies.

	- To equip participants with the practical skills required to work on data science projects. - To enable participants to apply data science in various domains such as business, healthcare, finance, and more. - To foster collaboration between Cochin University of Science & Technology and TCS in delivering high-quality training.
Justification for launching the programme proposed	Data science is a rapidly growing field with high demand for skilled professionals, and a short-term certification course can offer various benefits to both learners and institutions. This course can help meet the growing demand for data science professionals, make education more accessible and affordable, and provide a practical, industry-oriented learning experience. It aligns with the fast-paced, evolving nature of the data science field and offers a way for institutions to stay at the forefront of education and innovation. Here are some justifications for launching this program: 1. **Skills Gap**: There is a significant gap between the demand for data science professionals and the available talent. Many industries, including finance, healthcare, e-commerce, and marketing, require data scientists to make informed decisions and gain a competitive edge. A short certification course can help bridge this skills gap quickly. 2. **Accessibility**: A 3-month program is relatively short and accessible to a wide range of individuals, including those looking to upskill or change careers. This democratizes access to data science education and allows more people to enter this high-demand field. 3. **Practical Focus**: Short courses often have a practical, industry-oriented focus, making them attractive to learners who want to acquire real-world skills quickly. This focus on practical applications can help students get job-ready faster. 4. **Cost-Efficiency**: A shorter course is often more cost-effective than a long-term degree program. It enables learners to gain valuable skills without the financial burden of a full degree, making education more affordable and accessible. 5. **Fast-Track Career Entry**: A 3-month certification program allows students to enter the job market or switch careers more quickly. This is particularly beneficial for those who want to capitalize on the current demand for data science professionals.

	6. **Continuous Learning**: The field of data science is constantly evolving, with new tools and techniques emerging regularly. Short courses can serve as a means for professionals to continuously update their knowledge and stay relevant in the field.
	7. **Customization**: Short courses can be tailored to address specific skill gaps or industry needs. This flexibility allows institutions to design programs that align with the current demands of the job market.
	8. **Institutional Reputation**: Offering short, high-quality certification courses can enhance the reputation of an educational institution. It can attract more learners and create partnerships with businesses looking for a skilled workforce.
	9. **Industry Partnerships**: Collaborating with industry partners and bringing in professionals as instructors can enhance the course's practicality and ensure that students are learning the most up-to-date skills and tools.
	10. **Learner Feedback**: Institutions can quickly adapt the course based on learner feedback and industry trends, ensuring that the curriculum remains relevant and effective.
	11. **Global Accessibility**: Online delivery of such courses can make them accessible to a global audience, increasing the reach and impact of the institution.
	The program will be best suited for
	Individuals looking to quickly gain practical skills in data science, often including Working professionals, Career changers, Recent graduates, and Entrepreneurs. This program offers a fast-track, cost-effective way to acquire the knowledge and abilities required to enter the data science field or enhance career prospects.
Other institutes offering similar programmes	IIT Madras , IIT Kanpur, Online courses in Coursera and Udemy
Expected graduate outcomes of the proposed programme	The Graduates of this program will be able to apply their data science skills in a professional context and contribute effectively to data-driven decision-making in various industries.
Partnership with Industry if any for the proposed programme	TCS
Partnership with foreign universities if any for the proposed programme	

Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	40000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERTIFICATION COURSE-IV

Department proposing the programme	Division of Computer Science, SOE
Name of the proposed Programme	IT Upskill program on IOT and Embedded Systems
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	4 days
Description of the programme proposed	The programme is based on an exciting educational initiative that aims to empower school and college students with essential skills in the domains of the Internet of Things (IoT) and Embedded Systems. Our "Upskill Program on IoT and Embedded Systems" seeks to bridge the gap between classroom learning and practical, real-world application of cutting-edge technologies. The primary objectives of this program are as follows: ● To introduce students to the fundamental concepts of IoT and Embedded Systems. ● To provide hands-on experience in designing, building, and programming IoT devices. ● To cultivate problem-solving and critical thinking skills. ● To foster creativity and innovation among participants. ● To prepare students for future career opportunities in technology.
Justification for launching the programme proposed	The program is designed for secondary school and college students with a passion for technology and a desire to expand their knowledge and skills in IoT and Embedded Systems. Participants will be divided into appropriate age groups or skill levels to ensure an optimal learning experience.

	Delivery Format: The program can be delivered through offline sessions at schools/colleges. Our team of experienced instructors and facilitators will guide students through both theoretical and practical aspects.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	The specific outcomes are 1. **IoT and Embedded Systems Knowledge**: Graduates should have a solid understanding of IoT and embedded systems, including concepts, principles, and architectures. 2. **Embedded Programming Skills**: Proficiency in programming languages commonly used in embedded systems development, such as C and C++. Graduates should be able to write code to program microcontrollers and embedded devices. 3. **Sensor and Actuator Integration**: The ability to connect, configure, and utilize various sensors and actuators commonly used in IoT applications, such as temperature sensors, motion detectors, and motors. 4. **Data Communication Protocols**: Knowledge of communication protocols relevant to IoT, including Wi-Fi, Bluetooth, Zigbee, and LoRa. Graduates should be capable of setting up communication between embedded systems and IoT networks. 5. **IoT Cloud Platforms**: Familiarity with IoT cloud platforms and services for data storage, analysis, and device management. 6. **Hardware Design and Prototyping**: Basic skills in designing and prototyping electronic circuits and hardware systems for IoT and embedded applications. 7. **Real-time Operating Systems (RTOS)**: Understanding of real-time operating systems and their application in embedded systems. 8. **IoT Security Awareness**: An understanding of security principles and best practices in the context of IoT and embedded systems to ensure the safety and privacy of data. 9. **Hands-On Project Experience**: Graduates should have practical experience through hands-on projects that apply IoT and embedded systems concepts to real-world applications. This includes project planning, hardware integration, software development, and data analysis. 10. **Data Analysis**: The ability to analyze data collected from IoT devices and derive insights to make informed decisions.

	11. **Troubleshooting Skills**: Proficiency in troubleshooting hardware and software issues in embedded systems and IoT devices.
	12. **Collaborative and Communication Skills**: The ability to work effectively in cross-functional teams and communicate technical concepts to non-technical stakeholders.
	13. **Ethical Considerations**: Awareness of ethical and privacy issues related to IoT and embedded systems, and a commitment to responsible development and usage.
	14. **Job Readiness**: Graduates should be prepared to enter the job market, secure positions such as embedded systems engineer, IoT developer, or IoT system administrator, and contribute effectively to IoT-related projects.
	15. **Lifelong Learning Orientation**: An appreciation for the need for continuous learning in the rapidly evolving field of IoT and embedded systems, and the skills to stay updated with emerging technologies and trends.
	16. **Entrepreneurial Opportunities**: Graduates may be empowered to explore entrepreneurial opportunities in IoT-based product development or consulting services.
	17. **Certification**: Successful completion of the program and attainment of a certification, which can be used to demonstrate their competence to potential employers. These expected outcomes ensure that graduates of the IT Upskill program on IoT and Embedded Systems are well-prepared to participate in the development, deployment, and management of IoT applications and embedded systems in various industries, including healthcare, agriculture, smart cities, and more.
Partnership with Industry if any for the proposed programme	
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	30 students for each batch
Proposed fees for the proposed programme	20,000 for each 4 Day workshop
Additional Infrastructural requirements if any needed for the proposed programme	Have to purchase minimum quantity of IoT devices for conducting hands-on session

2.24.3 DIVISION OF ELECTRONICS AND COMMUNICATION

PG PROGRAMMES

Department proposing the programme	DIVISION OF ELECTRONICS ENGINEERING
Name of the proposed Programme	M.TECH DEGREE (FULL-TIME) IN ELECTRONICS DESIGN AND TECHNOLOGY
Nature of the programme proposed	Modification of existing, AICTE approved; hibernated.
Mode of delivery of the programme proposed	Hybrid (Work Integrated Learning Programmes)
Duration of the programme proposed	Two Years
Description of the programme proposed	The Programme is specially designed to cater the needs of industries. Companies which have MOU with our institute have offered willingness for association with the course. The Programme is of four semester with hybrid mode conducted mostly on weekends or after business hour to carry out the classes without any career break. Approved regulation permits syllabi revision every week. Hence, it is possible to cater industry specific programme as per collaboration of the current year. Semesters 1 and 2 comprises 5 theory subjects each one seminar and one industrial training/internship; Semesters 3 and 4 are dedicated for project. Project work in the final year allow students to apply concepts and techniques learned during the programme to real world situations. Projects could be part of live project in their domain. The education delivery methodology is a blend of classroom and experiential learning. Experiential learning consists of lab exercises, assignments, case studies and work-integrated activities. Classes will be conducted by a pool of faculty members comprising of academicians from CUSAT and guest faculty who are experienced industry professionals.
Justification for launching the programme proposed	Queries and suggestions from alumni and industries.
Other institutes offering similar programmes	BITS Pilani, IIT Indore, IIT Madras

Expected graduate outcomes of the proposed programme	Graduates of the program will possess advanced technical knowledge, practical skills, Innovation problem-solving, research competence, effective communication, real-world experience, leadership skills after completion of the course.
Partnership with Industry if any for the proposed programme	Discussions are going on with industries with MOU
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	1.5 lakhs per annum
Additional Infrastructural requirements if any needed for the proposed programme	Licensed software and Hardware kits.

CERTIFICATION COURSE-I

Department proposing the programme	DIVISION OF ELECTRONICS ENGINEERING
Name of the proposed Programme	Computer vision using Deep Learning
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	4 Months
Description of the programme proposed	A five-hour weekend programme or a two-hour programme after the regular working hours to reduce the difference between academics and industry
Justification for launching the programme proposed	A gap in the program outcomes from the academics and the requirements for the industry based on rapidly changing technological advancements
Other institutes offering similar programmes	IIT Delhi
Expected graduate outcomes of	• Understand and master basic knowledge, theories and methods in image processing

the proposed programme	and computer vision • Use of hardware and software that are relevant in industrial applications to implement object recognition and classification using Artificial intelligence and Deep Learning algorithms
Partnership with Industry if any for the proposed programme	No
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs.25000/-
Additional Infrastructural requirements if any needed for the proposed programme	Computer system with sufficient GPU not less than 8GB, Licensed MATLAB software.

CERTIFICATION COURSE-II

Department proposing the programme	DIVISION OF ELECTRONICS ENGINEERING
Name of the proposed Programme	Short term training programme on PCB design
Nature of the programme proposed	certification
Mode of delivery of the programme proposed	offline
Duration of the programme proposed	10 hrs
Description of the programme proposed	Every equipment having electronic circuit needs a dedicated printed circuit board. Design of PCB is critical for efficiency of the circuit especially when high frequency components, antenna or digital ICs are included. Certificate programme intends to provide a basic knowledge and preliminary hands on training. This would enable them to design single side PCBs of moderate complexity.
Justification for launching the programme proposed	Queries and suggestions from alumni and industries.Difficulty faced by students of all branches while doing hardware projects

Other institutes offering similar programmes	IHRD skill centre
Expected graduate outcomes of the proposed programme	Expertise to design PCB design as per requirement.
Partnership with Industry if any for the proposed programme	No
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme(Minimum 25)	25
Proposed fees for the proposed programme	Rs.1200/-
Additional Infrastructural requirements if any needed for the proposed programme	Licensed software and Milling machine.

CERTIFICATION COURSE-III

Department proposing the programme	DIVISION OF ELECTRONICS ENGINEERING
Name of the proposed Programme	Short term training programme on Embedded systems for AI
Nature of the programme proposed	Certificate course
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	10hrs
Description of the programme proposed	Intended to make students industry ready. After regular work hours, 2 hrs for five days or weekend 5hrs.
Justification for launching the programme proposed	Recently there is a huge demand for application of AI in all fields of technology. Students can get an exposure and start doing projects on their own. Inter departmental students can benefit from the course
Other institutes offering similar programmes	IHRD skill centre
Expected graduate outcomes of the proposed programme	Expertise to do AI based projects in their domain
Partnership with Industry if any for the proposed programme	Existing MOU with DigiToad Technologies
Partnership with foreign	No

universities if any for the proposed programme	
Number of seats in the proposed programme(Minimum 25)	25
Proposed fees for the proposed programme	Rs. 1000/-
Additional Infrastructural requirements if any needed for the proposed programme.	Renewal of license obtained for software and hardware kits attained through alumni.

2.24.4 DIVISION OF ELECTRICAL AND ELECTRONICS

CERTIFICATION COURSE

Department proposing the programme	Electrical and Electronics Engineering
Name of the proposed Programme	Electrical System Design and Estimation
Nature of the programme proposed	Short term training programme
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	2 months (2 hrs per day, 3 days per week)
Description of the programme proposed	This programme aims to impart the skill of energy analysis, design and drafting of Electrical Systems including panel schedule and wiring using AutoCAD Electrical, Revit and DIALux
Justification for launching the programme proposed	Market viability: Electrical installation companies, consultancies Admission criteria: 50% in Diploma/ B.Tech Target audience: Diploma in Electrical & Electronics Engineering/ Electronics & Communication Engineering or B.Tech in Electrical & Electronics Engineering
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	Electrical installation companies, consultancies
Partnership with Industry if any for the proposed programme	
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	20
Proposed fees for the proposed	Rs. 15000 per student

	programme	
Additional Infrastructural requirements if any needed for the proposed programme	Software required: AutoCAD Electrical, Revit and DIALux (free version)	

2.24.5 DIVISION OF INFORMATION TECHNOLOGY

PG PROGRAM

Department proposing the programme	Information Technology, School of Engineering
Name of the proposed Programme	Integrated M.Tech (B Tech in any discipline and M.Tech in Business Analytics and Intelligence)
Nature of the programme proposed	Offline
Mode of delivery of the programme proposed	
Duration of the programme proposed	5 years
Description of the programme proposed	Credits earned as part of B.Tech in the integrated program are transferred to the M.Tech program. Credit earned through the prerequisite courses offering from Information Technology.
Justification for launching the programme proposed	The program help students to complete two degrees in a shorter span of time. It costs less in terms of fees and other educational expenses.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	Total Timeline to earn Dual Degrees i.e. B.Tech & M.Tech could be significantly reduced in comparison to the normal course of time taken to earn B.Tech and M.Tech. The programs open up new career paths for students and enhance their employability.
Partnership with Industry if any for the proposed programme	Discussions going on
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	
Proposed fees for the proposed programme	Discussions going on

CERTIFICATION COURSE-1

Department proposing the programme	Information Technology, School of Engineering
Name of the proposed Programme	Full Stack Developer Course
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	Six months
Description of the programme proposed	Full Stack Developer course will help you gain expertise in the latest front-end and back-end technologies of Application Development. Gain hands-on experience with skills and technologies such as SQL, Java, Data Structures, JavaScript, HTML, CSS, NodeJS, React, etc. under the guidance of industry professionals.
Justification for launching the programme proposed	Full Stack Web Developer is one of the most popular and highly-paid job profiles in the present market.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	Software Developer
Partnership with Industry if any for the proposed programme	Yes , Industry Collaboration
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	40,000/- per student
Additional Infrastructural requirements if any needed for the proposed programme	No

CERTIFICATION COURSE-2

Department proposing the programme	Information Technology, School of Engineering
Name of the proposed Programme	Cloud Computing and DevOps
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	Six months
Description of the programme proposed	The Cloud Engineering and DevOps certification course helps to build fundamental knowledge and skill to become an expert in designing, planning, and scaling cloud implementations. By this course,

	student can gain the potential to deploy a secure and robust cloud storage infrastructure.
	The cloud computing course will help to master the core skill sets required for designing and deploying reliable applications. And this can be done across popular cloud platforms.
Justification for launching the programme proposed	Cloud engineers are in super demand because of the increasing popularity of cloud computing. And while the reliance on remote access continues to grow, the demand for talented IT experts with specialised skills is also growing. Cloud certification course caters to all professionals across various industries.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	Cloud engineers
Partnership with Industry if any for the proposed programme	Yes,
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme(Minimum 25)	30
Proposed fees for the proposed programme	40,000/- per student
Additional Infrastructural requirements if any needed for the proposed programme	No additional infrastructure

CERTIFICATION COURSE-3

Department proposing the programme	Information Technology, School of Engineering
Name of the proposed Programme	Software and Automation Test Engineer
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	Three months
Description of the programme proposed	Programmme is designed to provide a complete knowledge of software testing technologies such as Selenium Web Driver, TestNG, Maven, Auto IT,

	Selenium Grid, Appium, and Docker to build a robust testing framework.
Justification for launching the programme proposed	Course will advance the career as an automation test engineer.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	Software Developer
Partnership with Industry if any for the proposed programme	Yes, Industry Collaboration
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	15,000/- per student
Additional Infrastructural requirements if any needed for the proposed programme	No

CERTIFICATION COURSE-4

Department proposing the programme	Information Technology, School of Engineering
Name of the proposed Programme	Digital Marketing
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	Six- weeks
Description of the programme proposed	To efficiently promote and advertise the products and services online through various digital channels and strategies.
Justification for launching the programme proposed	Digital marketing is a constantly evolving field, and taking a course will help to stay up-to-date with the latest trends and best practices.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	Offers many different opportunities like social media marketing, web optimization and SEO, and digital data analysis.
Partnership with Industry if any for the proposed programme	Yes
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	10,000/-

Additional Infrastructural requirements if any needed for the proposed programme	No

CERTIFICATION COURSE-5

Department proposing the programme	Information Technology, School of Engineering
Name of the proposed Programme	AI-based-UAV design
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	Six- weeks
Description of the programme proposed	Fusion between UAV and artificial intelligence represents the response to many needs in aerial imagery and provides new headlines in the future of aerial technology for different sectors like Energy, Construction, Security, Agriculture etc
Justification for launching the programme proposed	Artificial intelligence-based UAV market is fast growing area
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	The demand for drone pilots, engineers, data analysts, and software developers is expected to increase in the future.
Partnership with Industry if any for the proposed programme	Yes
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	50,000/-
Additional Infrastructural requirements if any needed for the proposed programme	No

CERTIFICATION COURSE-6

Department proposing the programme	Information Technology, School of Engineering
Name of the proposed Programme	Centre of Excellence for Industry 4.0 Digital Technologies
Nature of the programme proposed	An excellence centre taking high end R&D projects, collection of information, development and dissemination of knowledge/information, facilitation in capacity building of industries in co-ordination with various stakeholders (university, industry, engineering

	students and professors).
Mode of delivery of the programme proposed	
Duration of the programme proposed	
Description of the programme proposed	Taking different technology consultancy projects and executing with the help of SoE engineering students, professors with local and international experts. Conducting research and gaining business intelligence ● CoE will function as a knowledge centre for the entrepreneurs, start-ups regarding concepts of Information Technology and its application in Industry 4.0 ● CoE will also disseminate this knowledge by undertaking consultancy projects, R&D projects, workshops, and training programmes to disseminate knowledge regarding practical applicability of Industry 4.0 ● CoE will also facilitate display of latest technology / demonstration projects for helping the new start-ups. ● CoE will also facilitate establishment of CoE in other universities.
Justification for launching the programme proposed	CoE can be organised into different clusters to be developed over period of time with development of Intellectual property (with the university). IPs/Patents/Ownership can be provided to the industries/businesses/star-up via licensing (under limited/defined royalty mechanism that is covered in the individually signed MoUs) for commercialization and scaling of the developed technologies.
Other institutes offering similar programmes	Clusters of Excellence https://www.tum.de/en/research/clusters -of- excellence (Centre Technical University of Munich)

	TUM Venture Labs: https://www.unternehmertum.de/ueber/tum-venture-labs
Expected graduate outcomes of the proposed programme	- Bring together a team of Professors, Students, and Experts (national/international) & Industries across disciplines. - CoE looks national and international projects and try to raise financing with a mix of alumni, university, govt and international grants.
Partnership with Industry if any for the proposed programme	Yes, Industry Collaboration
Partnership with foreign universities if any for the proposed programme	Yes
Number of seats in the proposed programme (Minimum 25)	
Proposed fees for the proposed programme	
Additional Infrastructural requirements if any needed for the proposed programme	Meet from initial budget to be raised from the Alumni

TWINNING PROGRAM-1

Department proposing the programme	Information Technology, School of Engineering
Name of the proposed Programme	Twinning Program (B Tech and MBA)
Nature of the programme proposed	Offline
Mode of delivery of the programme proposed	
Duration of the programme proposed	4 years UG in CUSAT and 1.5 years in University of West London (UAE campus)
Description of the programme proposed	4 years B Tech in Information Technology from CUSAT. Pre-request for MBA must be finished during their UG level. Remaining 1.5 years University of West London
Justification for launching the programme proposed	The program help students complete two degrees in a shorter span of time. It costs less in terms of fees and other educational expenses.
Other institutes offering similar programmes	

Expected graduate outcomes of the proposed programme	Students get to meet a large multicultural network of students, academicians, and professionals at the host universities. The programs open up new career paths for students and enhance their employability.
Partnership with Industry if any for the proposed programme	
Partnership with foreign universities if any for the proposed programme	University of West London
Number of seats in the proposed programme (Minimum 25)	
Proposed fees for the proposed programme	Discussions going on
Additional Infrastructural requirements if any needed for the proposed programme	

TWINNING PROGRAM-2

Department proposing the programme	Information Technology, School of Engineering
Name of the proposed Programme	Twinning Program (B Tech and M.Tech)
Nature of the programme proposed	Offline
Mode of delivery of the programme proposed	
Duration of the programme proposed	4 years UG in CUSAT and 2 years in Shimane University
Description of the programme proposed	4 years B Tech in Information Technology from CUSAT. Pre-request for PG must be finished during their UG level. 2 years PG at Shimane University, Japan
Justification for launching the programme proposed	The program help students complete two degrees in a shorter span of time. It costs less in terms of fees and other educational expenses.
Other institutes offering similar programmes	
Expected graduate outcomes of the	Students get to meet a large

proposed programme	multicultural network of students, academicians, and professionals at the host university. The programs open up new career paths for students and enhance their employability.
Partnership with Industry if any for the proposed programme	
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	
Proposed fees for the proposed programme	Discussions going on
Additional Infrastructural requirements if any needed for the proposed programme	

2.24.6 DIVISION OF MECHANICAL ENGINEERING

SKILL ACQUISITION PROGRMME-1

PROPOSAL FOR SHORT TERM COURSE	
Department proposing the programme	Division of Mechanical Engineering, SOE, CUSAT
Name of the proposed Programme	PRODUCT DESIGN & ENGINEERING
Nature of the programme proposed	Skill Acquisition Programme
Mode of delivery of the programme proposed	Hybrid mode
Duration of the programme proposed	6 months
Description of the programme proposed	Training in Product Design Engineering offers a practical and skill-oriented approach to learning. It is a good choice for BE / B Tech / Engineers to acquire specialized skills to stay competitive in the job market. Enhance your creativity, problem-solving skills, and technical expertise. This programme will prepare for entry level positions in product design firms, manufacturing companies, in

	start-up companies or build your career as freelance designers. What You Will Learn: - The process of product design and new product development - Create 3D models in computers - Develop skills to make and present virtual or actual concept models, appearance models, mock-ups, and prototypes - Learn prototype testing and design solution modifications - Generate innovative ideas and concepts for products that will satisfy the needs Tools & Techniques: - Engineering Drawing and 3D CAD - GD&T and Tolerance Stack Up Analysis Tool - CAE & Rapid prototyping techniques - Mould flow analysis tool - Design for manufacture & assembly - Inspection & Gauging - Elasticity, Plasticity and Finite Element Analysis - Design project management systems and tools
Justification for launching the programme proposed	India, a rapidly growing economy with a large and young population, has a strong engineering base, with over 1.5 million engineers graduating every year. However, there is a shortage of skilled product designers and engineers because the traditional engineering curriculum in India does not focus on product design and engineering. A skill acquisition program in product design and engineering would address this shortage by providing engineers with

	the skills and knowledge they need to design and develop innovative products. This would benefit both the engineers themselves and the Indian economy as a whole.
	The product design program you have described covers a wide range of topics, including
	• **Creativity and innovation:** This course will teach you how to think creatively and come up with innovative product ideas.
	• **Engineering drawing and 3D CAD**: This course will teach you how to create technical drawings and 3D models of products.
	• **Advanced materials and manufacturing processes:** This course will teach you about the different materials and manufacturing processes that are used to produce products.
	• **GD&T and tolerance stack up analysis**: This course will teach you how to use geometric dimensioning and tolerancing (GD&T) to ensure that products are manufactured to the correct specifications.
	• **Elements of design**: This course will teach you about the basic principles of design, such as color theory, typography, and layout.
	• **Media investigation and communication**: This course will teach you how to research and communicate your product ideas to others.
	• **New product development**: This course will teach you about the process of developing a new product from the initial idea to launch.
	• **Systematic innovation**: This course will teach you how to use systematic methods to generate and evaluate new product ideas.
	• **Detailed design and industrial**

	case study: This course will teach you how to design a product in detail and create a prototype.
	• **CAE and rapid prototyping**: This course will teach you how to use computer-aided engineering (CAE) software to simulate the performance of products and rapid prototyping technologies to create prototypes of products.
	• **Elasticity, plasticity and finite element analysis**: This course will teach you about the mechanical properties of materials and how to use finite element analysis (FEA) software to simulate the behavior of products under load.
	• **Design for manufacture and assembly (DFMA)**: This course will teach you how to design products that are easy to manufacture and assemble.
	• **Workshop and advanced 3D modelling:** This course will teach you how to use manufacturing tools and equipment and create advanced 3D models of products.
	• **Design of experiments:** Reliability engineering and optimization techniques: This course will teach you how to use design of experiments (DOE) methods to test and optimize product designs.
	• **Design management**: This course will teach you about the different aspects of managing product design projects.
	• **Human factors in product design**: This course will teach you how to design products that are safe, usable, and accessible to everyone.
	Overall, this product design program is very comprehensive and will provide you with the skills and

	knowledge you need to design and develop innovative products.
Other institutes offering similar programmes	School of Product Design, Kerala State Institute of Design (KSID) School of Postgraduate Studies (SPG), Nettur Technical Training Foundation (NTTF), Peenya, Bangalore
Expected graduate outcomes of the proposed programme	This programme will prepare for entry level positions in product design firms, manufacturing companies, in start-up companies or build your career as freelance designers.
Partnership with Industry if any for the proposed programme	SFO Technologies is an integral part of NeST Technologies
Partnership with foreign universities/ Institutions if any for the proposed programme	School of Postgraduate Studies (SPG), Nettur Technical Training Foundation (NTTF), Peenya, Bangalore
Number of seats in the proposed programme (Minimum 12)	15
Proposed fees for the proposed programme	60,000/-
Additional Infrastructural requirements if any needed for the proposed programme	High end computational facility for learning modelling and analysis tools for product design. Make use of tools available in SOE, CUSAT and SFO Technologies

CERTIFICATION COURSE-2

Department proposing the programme	MECHANICAL ENGINEERING
Name of the proposed Programme	INDUSTRIAL PROCESS ENGINEERING: Theory and Practice
Nature of the programme proposed	Certificate course
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	60 hours/ 3 months
Description of the programme proposed	The course is intended to introduce the operational aspects of general process industries which includes refineries, chemical plants, power plants, cement plants etc. The course is interdisciplinary in nature and is

	proposed to include demonstrations by experts in industries and regular factory visits at industrial partner's premises.
	Course outcomes:
	The participants are expected to attain following outcomes from successful completion of this course:
	- Familiarize with process plant's equipment and instruments - Enumerate the primary elements of industrial control systems - Interpret intricate electrical schematics, single-line diagrams, plumbing and instrumentation diagrams, and utility layouts - Use the terminology of mechanical, electrical, and control engineers to communicate effectively with them - Apply cross-disciplinary expertise to real world problem-solving
	Course contents (Theory-Jointly by CUSAT/Industrial Partner)
	- An introduction to process plants in practice - Types of process plants - Documentation requirement for plants - Understanding complex plumbing and instrumentation diagrams (P&I) - Rotating equipment: pumps and compressors - Transport systems for solids and liquids - Basic electrical concepts and elements in power distribution - Control systems and it's

	integration in process for protective functions • Introduction to PLCs, and automation **<u>Support from Industry partner</u>** • Process industry/factory tour at industrial partner • Industrial control panels demonstration • Tracing process through the plant with P&I diagrams • Electrical schematics demonstration • Mini project based on industrial problems **<u>Workshops (Jointly by CUSAT/Industrial Partner)</u>** • Troubleshooting for maintenance • Component identification in a processing facility • Safety standards and legal aspects in process industry
Justification for launching the programme proposed	There are several continuous operation process plants in our country and aboard employing thousands of engineers from specialisations like chemical, mechanical, electrical and instrumentation. However, the traditional engineering courses seldom prepare students for such a diversified role wherein employees are expected to get involved in basic operational and maintenance aspects which may be not their area of specialisation. Thus, companies have to spend a huge amount in training newly joined employees to make them competent in the field. As a lot of technical aspects are common to all process industries, it is high time that we introduce students to the basic concepts of operation in process plants through a course tailor-made for industries with collaboration from a reputed industrial partner. The main objective of the course can be stated as an attempt to

	bridge the knowledge gap between traditional engineering courses and practical aspects of operation in various process industries. **Target Audience** • Engineering graduates aspiring for job in process industries (Branches like Chemical, Mechanical, Electrical, Electronics etc.) • Final year students of above branches • Employees of other industries looking for a career change
Other institutes offering similar programmes	IIT Bombay, BITS Pilani
Expected graduate outcomes of the proposed programme	Process engineers are in great demand and with their multidisciplinary knowledge are highly paid as well. This course is a stepping stone for anyone intending to work in any process industry. With the professional training given by Industry experts the participants are highly likely to get job offers in industries including refineries, chemical plants, power plants, cement plants.
Partnership with Industry if any for the proposed programme	Proposed partner: The Fertilizers and Chemicals Travancore Limited, Kochi (FACT Ltd)- Dialogues are in progress with Director (Technical) of FACT Ltd for collaboration
Partnership with foreign universities if any for the proposed programme	NA
Number of seats in the proposed programme(Minimum 25)	30
Proposed fees for the proposed programme	Rs 10000/-
Additional Infrastructural requirements if any needed for the proposed programme	Nil

2.24.7 DIVISION OF SAFETY AND FIRE ENGINEERING

CERTIFICATION COURSE-1

Department proposing the programme	Division of Safety and Fire Engineering, SOE
Name of the proposed Programme	STTP on Safety and Fire Engineering
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	10 days/ 2 Weeks
Description of the programme proposed	This Programme aims on covering relevant topics in the field of safety and fire engineering. Some of the primary topics covered in the programme are Fire protection Engineering, Basic Fire Fighting,Life Saving Techniques, Environmental Engineering and management, Environmental impact assessment, Safety Management, Accident Prevention and Investigation, Behaviour Based safety, Process Safety and Risk Analysis, Electrical Safety, Construction Safety, Chemical Hazards and Prevention and Risk assessment techniques. This programme is open for all personals from any education background. By attending this programme, the attendees will be gaining an overall idea on almost all aspects of safety and fire Engineering
Justification for launching the programme proposed	In this present scenario, in any industry as well as our daily life safety is an important aspect. Those who are working in industries especially in work contracts will not be properly trained under a Safety professional. This proposed programme gives all the participants a deep understanding on various fields of safety and fire engineering with proper practical knowledge. This programme is open for all personnels with any education back ground

Other institutes offering similar programmes	National Safety Council
Expected graduate outcomes of the proposed programme	The attendees will be able to manage the safety aspects of a medium-scale industry
Partnership with Industry if any for the proposed programme	NA
Partnership with foreign universities if any for the proposed programme	NA
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	Rs. 8000/- +GST
Additional Infrastructural requirements if any needed for the proposed programme	UPS for the classroom (to maintain uninterrupted power supply)

2.25 SCHOOL OF ENVIRONMENTAL STUDIES

PG PROGRAMME

Name of the proposed Programme	MTech in Industrial refuse management
Nature of the programme proposed	New degree Programme
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	2 years
Description of the programme proposed	The program's curriculum is meticulously structured to provide students with a solid foundation in industrial waste management. **Objectives and Learning outcomes:** **Objectives:** Expertise in Industrial Refuse Management: To provide students with comprehensive knowledge and skills to effectively manage industrial waste, including hazardous and non-hazardous materials, in a responsible and sustainable manner. Resource Recovery: To equip students with the expertise to identify opportunities for resource recovery within industrial waste streams, contributing to economic sustainability and resource conservation. Environmental Compliance: To ensure that graduates understand and can navigate the complex web of environmental regulations related to industrial waste management and can ensure compliance in various industrial settings. Sustainable Practices: To instil in students a sustainability mindset, encouraging them to minimize waste generation, reduce environmental impacts, and promote circular economy principles within industries. Innovative Technologies: To familiarize students with emerging and

	innovative waste management technologies, enabling them to evaluate and implement advanced solutions in the field.
	Problem-Solving Skills: To enhance students' ability to identify and address real-world waste management challenges through research, analysis, and critical thinking.
	Environmental Impact Assessment: To enable students to conduct comprehensive environmental impact assessments of waste management practices and develop mitigation strategies.
	Interdisciplinary Perspective: To encourage collaboration across disciplines, fostering a holistic approach to industrial refuse management that considers social, economic, and environmental aspects.
	Learning Outcomes:
	Upon successful completion of the MTech in Industrial Refuse Management Program, students should be able to:
	1. Analyze and Characterize Industrial Waste:
	- Identify and categorize different types of industrial waste.
	- Conduct waste sampling and analysis to determine composition and characteristics.
	2. Apply Waste Treatment Technologies:
	- Understand and implement various waste treatment methods, including biological, physical, and chemical processes.
	- Design, operate, and optimize waste treatment systems.
	3. Promote Resource Recovery:
	- Identify opportunities for resource

	recovery and value extraction from waste streams.
	- Develop strategies for recycling and reusing materials, contributing to economic sustainability.
	4. Ensure Environmental Compliance:
	- Interpret and apply environmental regulations related to industrial waste management.
	- Monitor and ensure compliance with legal requirements in industrial settings.
	5. Advocate Sustainable Practices:
	- Propose and implement waste minimization strategies.
	- Promote circular economy principles in industries to reduce waste generation.
	6. Evaluate Innovative Technologies:
	- Assess and select emerging waste management technologies based on environmental and economic considerations.
	- Implement advanced solutions for efficient waste handling.
	7. Conduct Environmental Impact Assessments:
	- Conduct comprehensive environmental impact assessments of waste management practices.
	- Develop and recommend mitigation measures to minimize environmental harm.
	8. Collaborate and Communicate Effectively:
	- Collaborate with interdisciplinary teams to address complex waste management challenges.
	- Communicate waste management strategies and findings clearly to

	diverse stakeholders.
	9. Ethical and Sustainable Practices:
	- Apply ethical principles in waste management decision-making.
	- Advocate for sustainability in industrial refuse management.
	10. Research and Innovation:
	- Conduct original research in industrial refuse management.
	- Contribute to the development and dissemination of innovative waste management solutions.
	These objectives and learning outcomes collectively prepare graduates to be industry-ready professionals capable of addressing industrial waste management challenges, promoting sustainability, and ensuring environmental compliance in a rapidly evolving field.
	Practical Training and Research:
	To bridge theory with practice, the program offers hands-on experiences and research opportunities. Students may engage in waste audits, pilot projects, and case studies, collaborating closely with industry partners and subject matter experts. These practical experiences provide a tangible, real-world perspective and enhance students' problem-solving skills.
	Career Prospects:
	Graduates of the "MTech in Industrial Refuse Management" program are exceptionally well-prepared for diverse and rewarding careers. They may find employment in:
	Environmental consulting firms, where they contribute to sustainable waste management solutions.
	Waste management companies, overseeing waste collection, treatment,

	and disposal operations. Government agencies, where they work on waste policy development and regulation enforcement. Research institutions, exploring innovative waste management technologies and strategies. Industries with significant waste generation, focusing on in-house waste reduction, resource recovery, and sustainability practices. **Conclusion:** In a world grappling with mounting environmental challenges, the "MTech in Industrial Refuse Management" program emerges as a beacon of hope. It equips students with the expertise to transform waste into opportunities, reducing environmental harm and fostering a sustainable future. This program represents a pivotal step toward addressing the pressing issues of industrial waste management, making it an indispensable asset in the global pursuit of sustainability. Graduates of this program will lead the charge in effecting positive change, ushering in an era where industrial refuse is managed responsibly, sustainably, and with a steadfast commitment to a cleaner planet.
Justification for launching the programme proposed	The proposal for launching an "MTech in Industrial Refuse Management" program is grounded in several compelling reasons, including the urgent global need for sustainable waste solutions, market viability, and a clear demand for professionals with expertise in industrial waste management. **Market Viability:** Rising Environmental Concerns: With growing awareness of environmental issues, industries are under increasing

	pressure to adopt sustainable practices. The management of industrial refuse has become a critical concern for businesses worldwide, creating a substantial market for experts in this field.
	Regulatory Landscape: Stringent environmental regulations governing waste management necessitate companies to employ skilled professionals who can ensure compliance and minimize environmental impact. This regulatory environment amplifies the demand for individuals with specialized knowledge in industrial refuse management.
	Resource Recovery: The push for resource recovery and circular economy principles is gaining momentum. Industries are seeking ways to extract value from their waste streams. Graduates with expertise in resource recovery are well-positioned to facilitate this transition.
	Environmental Sustainability: Sustainability is now a key focus for companies seeking to reduce waste generation, cut costs, and enhance their corporate social responsibility. Professionals with training in industrial refuse management are pivotal in helping organizations achieve their sustainability goals.
	Admission Criteria:
	To ensure that the program attracts qualified candidates and meets the market demand, the admission criteria may include:
	A bachelor's degree in a related field (e.g., environmental science, engineering, chemistry).
	Relevant work experience in environmental or waste management (preferred but not mandatory).
	A statement of purpose outlining the

	candidate's interest in the program and career goals.
	A standardized test score of CUSAT CAT, GATE score.
	An interview and group discussion to assess motivation and commitment.
	Target Audience:
	The "MTech in Industrial Refuse Management" program is designed for a diverse group of individuals who seek to become experts in industrial waste management:
	Recent Graduates: Graduates in environmental science, engineering, or related fields looking to specialize in industrial waste management.
	Mid-Career Professionals: Individuals already working in environmental roles or waste management who want to enhance their knowledge and career prospects.
	Industry Personnel: Employees from industries with significant waste generation, seeking to improve in-house waste management practices.
	Government and Regulatory Officials: Those involved in waste policy development and enforcement, aiming to gain specialized expertise.
	Conclusion:
	The proposal to launch the "MTech in Industrial Refuse Management" program is well-justified by the increasing demand for professionals in this field. As industries and governments globally strive to address environmental challenges and meet sustainability targets, the program aligns perfectly with market needs. Its comprehensive curriculum, admission criteria, and diverse target audience ensure that it will not only meet but exceed market expectations, producing graduates equipped to drive

	sustainable waste management practices and resource recovery in the industrial sector.
Other institutes offering similar programmes	IIT Bombay, NIT Trichy, Amrita Vishwa Vidyapeetham, Anna University, IIT Rourkee, offers M.Tech in Environmental Science and Engineering, environmental management of rivers and lakes etc, their program includes aspects of waste management and environmental sustainability components.
Expected graduate outcomes of the proposed programme	Graduates who successfully complete an "MTech in Industrial Refuse Management Program" are well-equipped to pursue a wide range of rewarding career opportunities. This specialized program prepares them with the knowledge and skills needed to address industrial waste management challenges, promote sustainability, and ensure compliance with environmental regulations. Here are some potential career paths and opportunities for program participants: **Environmental Consultant:** Environmental consultants work with various industries and organizations to develop and implement waste management strategies, conduct environmental impact assessments, and ensure compliance with environmental regulations. Graduates can advise clients on sustainable waste practices and help them minimize environmental impacts. **Waste Management Specialist:** Waste management specialists are experts in handling and disposing of waste materials efficiently and responsibly. They can find employment with waste management companies, municipal governments, or industrial facilities, overseeing waste collection, treatment, and disposal operations.

	Resource Recovery Manager:
	Graduates may work as resource recovery managers, focusing on extracting valuable materials from waste streams. They can help industries identify opportunities for recycling, reusing, or upcycling waste products, contributing to resource conservation and cost savings.
	Environmental Compliance Officer:
	Environmental compliance officers ensure that industries and organizations adhere to environmental regulations, including those related to waste management. They monitor and enforce compliance, conduct inspections, and collaborate with regulatory agencies to maintain environmental standards.
	Research Scientist/Environmental Analyst:
	Some graduates may choose careers in research institutions, where they can conduct studies on innovative waste management technologies, environmental impact assessments, or pollution prevention strategies. They can contribute to the development of new and improved waste management practices.
	Government Regulator:
	Graduates may pursue careers with government agencies responsible for regulating environmental and waste management practices. They can participate in policy development, enforcement, and monitoring to ensure that industries and municipalities meet environmental standards.
	Sustainability Manager:
	Sustainability managers work within organizations to develop and implement sustainability initiatives, including waste reduction and resource recovery programs. They

play a crucial role in promoting sustainable business practices.

Educator/Trainer:

Graduates with a passion for teaching and training can become educators, teaching waste management and environmental science courses at universities, colleges, or training centres. They can help educate the next generation of environmental professionals.

Entrepreneur/Consulting Firm Owner:

Some graduates may choose to start their own environmental consulting firms, offering specialized services in industrial refuse management. They can provide expertise to businesses seeking sustainable waste solutions.

Corporate Sustainability Coordinator:

Many large corporations now have sustainability departments focused on reducing their environmental footprint. Graduates can work as sustainability coordinators, helping companies develop and implement waste reduction and sustainability initiatives.

Nonprofit and NGO Positions:

Graduates can find opportunities with environmental nonprofit organizations and non-governmental organizations (NGOs) dedicated to waste reduction, environmental conservation, and sustainable development.

Ph.D. and Research Positions:

For those interested in further research and academia, pursuing a Ph.D. in environmental science or a related field can open up research and teaching positions at universities and research institutions.

Overall, completing an "MTech in Industrial Refuse Management

	Program" opens a diverse and dynamic range of career opportunities in environmental management, waste reduction, sustainability, and environmental compliance. These professionals play a crucial role in addressing environmental challenges and advancing sustainable practices in industries and communities.
Partnership with Industry if any for the proposed programme	We are looking forward for partnership with Industries like BPCL, FACT, and other industries in India.
Partnership with foreign universities if any for the proposed programme	The programme provides an opportunity for collaboration with foreign universities. We are looking forward for collaborations with foreign universities.
Number of seats in the proposed programme (Minimum 25)	For M.Tech we propose for only 10 Seats due to infrastructure cringe at School of Environmental Studies. The total number of seats will be capped at 10. Out of this, 3 will be reserved for experienced categories and other 7 will be open for all.
Proposed fees for the proposed programme	₹75,000/per semester (Total cost of the programme: 3 Lakhs)
Additional Infrastructural requirements if any needed for the proposed programme	A dedicated floor for conducting regular classes, expanding the library space, and setting up new laboratories with advanced facilities to conduct practical classes for the proposed MTech Program.

P G DIPLOMA COURSE

Name of the proposed Programme	Environmental Management System and Law.
Nature of the programme proposed	Postgraduate Diploma
The mode of delivery of the programme proposed	All classes are in online mode. Only examinations are offline.
Duration of the programme proposed	One year
Description of the programme proposed	**Programme description:** To provide a better understanding of

	environmental green law issues affecting India and worldwide, the exclusive tailor-made programme provides opportunities for Environmental & law graduates and other professionals working in the field of environment to enrich their understanding of the issues, Institutions, policies, and initiatives in the field of environmental Management Systems and law.
	The objectives of the programme are to:
	1. To impart an understanding of the systems approach to Environmental Management as per ISO 14001 and skills for environmental performance in legal compliance, pollution prevention, and continual improvement.
	2. Provide comprehensive knowledge to participants in Environmental Law and Policy
	3. Increase understanding of key issues related to national as well as international environmental law and policies
	4. Develop practical skills to facilitate effective engagement with Environmental management tools and Laws
	5. Promote networking and sharing of experiences among participants to actively contribute towards conservation
	<u>Highlights of the course</u>
	1. Will be able to identify the environmental problems and apply appropriate knowledge and skills to selected case studies in real-life situations.
	2. Prepare well-informed professionals in the implementation of various Environmental Management Systems and upgrade their

186

	professional competencies by augmenting the Environmental Law Awareness
Justification for launching the programme proposed	It is essential to minimize the adverse impacts of pollution and ecological degradation through proper environmental management, policies, and legislation. This can be done by raising awareness of environmental values and strengthening the delivery capacity of environmental professionals so that they are well-equipped to face the challenges in their work stream. The proposed Postgraduate Diploma programme in Environmental Management System and Law will give a cutting edge to the students pursuing post-graduation in any related subject. The highlight of this course is that they will be awarded the certificate along with the completion of their main programme. The course is offered in a hybrid mode, which will be catered for during weekdays and selected holidays. **Target group** The programme is useful to students and working professionals from various streams who seek to enhance their skills in EMS and legal environmental protection interventions and bridge the gap between theory and practice. Law graduates, Legal practitioners, Environmental professionals, Corporate Executives, Government officials, Media, and NGO personnel seeking to enrich their professional knowledge are encouraged to apply.
Other institutes offering similar programmes	• Centre for Environmental Law – WWF – India • National Law University Delhi • Cambridge • Anna University etc.
Expected graduate outcomes of the	The expected outcome of the

proposed programme	programme is that the students will be awarded the diploma certificate along with their postgraduate degree certificate with the add-on skills, which makes them more skilled and competent for employability.
Partnership with Industry if any for the proposed programme	In collaboration with the School of Legal Studies, CUSAT.
Partnership with foreign universities if any, for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	The total number of seats will be capped at 50
Proposed fees for the proposed programme	Rs. 10,000/semester for TWO semesters (Total cost of the programme: Rs. 20,000/- (Twenty Thousand only)
Additional Infrastructural requirements if any needed for the proposed programme	1. Two large halls to accommodate 50 students at a time for the conduction of examination, discussion forums, and viva voce; 2. Five computers/laptops with high-speed internet nodes;

CERTIFICATION COURSE

Name of the proposed Programme	Environmental Monitoring and Analysis (water, sediment, soil and air)
Nature of the programme proposed	Certification
The mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	4 months
Description of the programme proposed	Environmental monitoring generally provides data on average concentrations in environmental media (air, water, soil, sediment). Peak concentrations are obtained when the measurement is performed at the point of discharge (air, water). Monitoring implies a number of activities in order to capture concentrations in the environmental compartments: from the preparation of a statistically sound sampling scheme to the selection of a sampling method, transport, storage, analytical and laboratory requirements for the

	analysis, as well as data quality and reporting issues. The course aims to provide a comprehensive understanding of water, sediment, air and soil quality, its management and control and to impart basic skills to the participants regarding water/soil pollution monitoring and handling basic equipment in the pursuit. The course describes the underpinning basic science of the environmental matrices, particularly water and soil with the possible fate of xenobiotics. It explains the causes and the effects/impacts of xenobiotics. Field demonstrative practical exercises are introduced.
	The objectives of the programme include
	(a) Collection of samples from various locations in a valid manner consistent with good laboratory practice. (b) Analyzing samples either collected or provided using laboratory equipment to determine the physical & and chemical components. (c) Recording the findings for reference and reporting purposes. (d) Producing reports as necessary
Justification for launching the programme proposed	The availability of pristine water is scarce. There is a strong demand for protecting the water resources free of contamination. To ensure sustainability several key factors have to be considered. There are several sources that contaminate the water resources. The monitoring of specific compounds and chemical contaminants in water is therefore necessary. These include the content of nitrogen or the organic load of industrial wastewater, the quality of drinking water or the concentration of chemicals in coastal/seawater. Unsustainable agricultural soil treatment combined with extreme weather conditions such as flooding, high temperatures and drought presents farmers with problems like soil compaction, nutrient depletion or excess nutrient supply. The leaching of xenobiotics to water bodies and their fate has to be addressed. The course outcomes are
	Explain the principles of pollution monitoring & and analysis. Demonstrate knowledge of the activities covered in the course and their implications on the environment.
	Sampling procedures, clean-up and sample preparation for analysis of water, sediment, air and soil.
	Anthropogenic activities that influence the environment and their adverse effects on the environment;

	Use of monitoring techniques and data processing in the affected environment; and the need to protect the environment. The focus group is Graduates in Environmental Science, Chemistry, Biology, Physics, NGOs, Industry personal.
Other institutes offering similar programmes	NEERI Nagpur, Centre for science and environment, Deemed Universities, TERI
Expected graduate outcomes of the proposed programme	The course provides a structure to create an Environmental Management System (EMS). The trainee is offered to learn all the techniques which are carried out for sampling water, soil and sediment and gets an overview of the importance of meeting the requirements of related National and International Standards. The career opportunities of fresh graduates will be improved in industries.
Partnership with Industry if any for the proposed programme	We are looking forward to partnerships with Industries like BPCL, and HOCL.
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	Rs 10, 000
Additional Infrastructural requirements if any needed for the proposed programme	Classroom and Laboratory facilities

MOOC COURSE-1

Name of the proposed Programme	**Industrial Ecology and Circular Economy**
Nature of the programme proposed	**New MOOC Course**
Mode of delivery of the programme proposed	**Online**
Duration of the programme proposed	6 months (**3 credits**)
Description of the	**Course Description:** This Massive Open Online Course

programme proposed	(MOOC) on **Industrial Ecology and Circular Economy** aims to provide a comprehensive understanding of the principles, concepts, and practices related to sustainable resource management and circularity in industrial systems. Participants will explore various strategies and tools for optimizing resource use, minimizing waste, and transitioning to more sustainable production and consumption patterns. **Prerequisites:** There are no specific prerequisites for this course. However, a basic understanding of environmental science and sustainability concepts would be beneficial. **Course Outline:** *Introduction to Industrial Ecology and Circular Economy* Understanding the concepts of industrial ecology and circular economy, Historical context and evolution of sustainability in industry, Key challenges and opportunities. *Systems Thinking in Industrial Ecology* Systems theory and its application to industrial systems, Analyzing industrial ecosystems, Identifying system boundaries and stakeholders. *Life Cycle Assessment (LCA)* Introduction to LCA principles, LCA methodology and its application, Case studies and practical exercises. *Design for Sustainability* Sustainable product and process design, Eco-design principles and tools, Cradle-to-cradle design concepts. *Resource Efficiency and Waste Reduction* Resource efficiency strategies in industry, Minimizing waste and emissions, Lean manufacturing and green supply chain management. *Circular Business Models* Circular economy business models, Extended Producer Responsibility (EPR), Circular design thinking. *Recycling and Material Flow Analysis* Recycling and its environmental impact, Material Flow Analysis (MFA), Circular material management. *Policy and Regulatory Frameworks* National and international policies promoting circular economy, Case studies of successful policy implementation, Challenges and future directions.

	Industry Case Studies Real-world examples of circular economy implementation, Guest speakers from industry, Lessons learned and best practices. *Future Trends and Emerging Technologies* Emerging technologies and their role in industrial ecology, Circular economy in the digital age, Anticipated challenges and opportunities.
Justification for launching the programme proposed	Industrial ecology and circular economy are significant because they provide a holistic approach to sustainability that not only minimizes environmental harm but also promotes economic growth and social well-being. These concepts are critical for addressing the complex and interconnected challenges facing our planet, including resource scarcity, pollution, and climate change.
Other institutes offering similar programmes	Center for Science and Environment, Lund University University of London, etc
Expected graduate outcomes of the proposed programme	**Certification:** Upon successful completion of the course, participants will receive a certificate of achievement. This MOOC syllabus provides a structured framework for exploring the key concepts and practices in Industrial Ecology and Circular Economy. It allows participants to gain a holistic understanding of sustainability in industrial systems and equips them with the knowledge and tools to contribute to a more sustainable future.
Partnership with Industry if any for the proposed programme	-
Partnership with foreign universities if any for the proposed programme	-
Number of seats in the proposed programme (Minimum 25)	25+
Proposed fees for the proposed programme	At par with NPTEL courses
Additional Infrastructural requirements if any needed for the proposed programme	Honorarium to the resource person as applicable Accommodation in University Guest house while MOOC recording

MOOC COURSE-2

Name of the proposed Programme	**ECOTOURISM AND MANAGEMENT**
Nature of the programme proposed	**NEW MOOC COURSE**
Mode of delivery of the programme proposed	**Online**

Duration of the programme proposed	6 months (3 credits)
Description of the programme proposed	This 3-credit MOOC course on **Ecotourism and Management** is a comprehensive exploration of the principles, strategies, and challenges associated with sustainable ecotourism. Participants will delve into the complexities of ecotourism planning, management, and its role in conservation, community development, and responsible tourism practices. **Prerequisites:** There are no specific prerequisites for this course. However, a basic understanding of tourism concepts and environmental conservation is beneficial. **Course Outline:** *Introduction to Ecotourism* Defining ecotourism and its core principles., Historical context and evolution of ecotourism. The relationship between ecotourism, conservation, and community development. *Biodiversity and Ecosystems* Understanding biodiversity and its significance. Ecosystem services and their connection to ecotourism. Case studies showcasing ecotourism's impact on biodiversity conservation. *Sustainable Tourism Principles* Core principles of sustainable tourism. Sustainable tourism certifications and standards. Assessing and mitigating the environmental impact of tourism. *Ecotourism Planning and Development* Strategies for planning and designing ecotourism destinations. Identifying and addressing potential negative impacts. Engaging and empowering local communities in ecotourism development. *Marketing and Promotion of Ecotourism* Effective marketing strategies for ecotourism destinations. Branding and storytelling for ecotourism businesses. Leveraging digital marketing and social media for ecotourism promotion. *Ecotourism Operations and Management* Managing visitor experiences in ecotourism settings. Ensuring safety and sustainability in ecotourism operations. Real-world case studies of successful ecotourism businesses. *Responsible Tourist Behavior* Educating tourists about responsible and sustainable behavior. Managing tourist interactions with wildlife and natural habitats. Promoting ethical wildlife viewing and engagement. *Cultural Heritage and Community Engagement* Understanding the importance of cultural heritage in ecotourism. Strategies for involving and benefiting local

	communities. Cultural sensitivity and respect in ecotourism operations.
	Ecotourism Policy and Regulations
	Examining national and international policies promoting ecotourism. Case studies of successful policy implementation. Challenges and future directions in ecotourism regulation.
	Ecotourism and Climate Change
	Addressing climate change in ecotourism. Sustainable transportation and energy solutions. Adaptation and resilience in ecotourism destinations.
	Sustainable Business Practices
	Sustainable supply chain management in ecotourism. Green certifications and eco-friendly practices.Sustainable financing and investment in ecotourism ventures.
	Future Trends and Challenges in Ecotourism
	Emerging trends in ecotourism. Sustainable innovation and technology in ecotourism. Balancing growth and sustainability in the industry.
Justification for launching the programme proposed	**Target Audience:** Students and professionals interested in pursuing a career in ecotourism, sustainable tourism, or conservation. Tour operators, hospitality industry professionals, and travel agents. Individuals passionate about promoting responsible tourism and environmental conservation.
Other institutes offering similar programmes	**Indian Institute of Ecology and Environment, Indian Institute of Tourism and Travel Management, As part of MBA in Tourism**
Expected graduate outcomes of the proposed programme	Upon successful completion of the course and final project, participants will receive a 3-credit certificate, affirming their expertise in ecotourism and management. This certificate can be a valuable asset for career advancement and demonstrating their commitment to sustainable tourism practices.
Partnership with Industry if any for the proposed programme	-
Partnership with foreign universities if any for the proposed programme	-
Number of seats in the proposed programme (Minimum 25)	25+
Proposed fees for the proposed programme	At par with NPTEL Courses
Additional Infrastructural	Honorarium to the resource person as applicable

requirements if any needed for the proposed programme	Accommodation in University Guest house while MOOC recording

2.26 SCHOOL OF INDUSTRIAL FISHERIES

PG PROGRAMME-1

Name of the proposed Programme	MSc Food Safety and Business Management
Nature of the programme proposed	Modification of existing PG programme (MFSc Seafood Safety & Trade)
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	Four semesters
Description of the programme proposed	A brief note on the content of the programme (Max 500 words) The proposed MSc programme in Food Safety and Business Management is a modification to the existing MFSc Seafood Safety and Trade which was a much sought after Masters Programme offered by School of Industrial Fisheries for the past one decade from 2012. This programme provides a holistic Food Safety approach to the food supply chains. The programme is designed around the entire process of food product development, food safety and business management — from concept to launch. Technical, managerial and entrepreneurial skills development during the programme enable the post graduates to develop a career in food industry and related sectors. The programme also offers practical and theoretical expertise required for working in food related industries and research institutions. The content of the programme includes innovations and practices in food handling, processing, packaging and storage, food safety, food safety risks, microbiological, food safety legislations, food safety management and business management. Business management includes market research, supply chain management, international marketing, and food economics. Objectives and learning outcomes The objective of this program is to prepare degree holders

	towards business, academic, research as well as entrepreneurships
	By the end of the programme, students will have knowledge and assimilation of
	-In-depth specialist knowledge needed to ensure that newly developed food products meet the necessary processing requirements for ensuring the quality and safety of food. Students will also gain a broad understanding of food related legislations and how this impacts the food business and industry.
	- Key concepts of business, academic, research as well as entrepreneurships.
	- Ability to use appropriate techniques, skills, and modern tools in the food industry and the academic profession, research and entrepreneurships.
	- Practical and theoretical expertise required for working in food-related industries, research institutions. Highlights of the course 1. The programme is of four semesters, where the focus would be on theoretical foundations in the first year and field exposure in the second year. 2. The students earn an MSc degree from CUSAT, one of the most reputed universities in the country. 3. The food institutes in the country will provide all the necessary field support in terms of mentoring, incubation and professional networking. 4. Two months Fulltime internship with a food business/processing firm in 4th semester 5. Start up firm / incubator after the second semester and One semester full time placement with the incubator for developing final product and launching the start-up are unique to this course 6. The classes will be handled by the faculty in the school as well as best of academicians and practitioners from other institutions. The programme uses a Continuous Evaluation System that assesses the learners over convenient and regular intervals.
Justification for launching the programme proposed	A note of the market viability. Mention admission criteria, target audience etc to show sufficient demand The production of nutritious and safe food for everyone is a key priority worldwide. Quality and safety of food is very crucial in our society. Governments across the world are putting pressure on the food industry to ensure products are safe and made to a high standard. That's why the demand for qualified experts in this field is ever-growing

	and the career opportunities are vast.
	India holds the sixth-largest food and grocery market in the world with 70% of retail sales. The Indian food industry is poised for huge growth, increasing its contribution to world food trade every year. In India, the food sector has emerged as a high-growth and high-profit sector due to its immense potential for value addition, particularly within the food processing industry.
	The existing MFSc Seafood Safety & Trade programme post graduate students received placements in seafood industry in the initial years of the programme launch and then began obtaining jobs not only in seafood industry but also in various domains such as HORECA industry (Hotels, Restaurants, Catering), food processing companies, spice and condiments, tea and coffee, cereals, rice, food safety industries, packaging industries, quality control organizations, and food research laboratories. It became imperative to broaden the scope from seafood safety and trade to food safety and food business management.
	As years passed we were unable to cater students as per the requirements of the food industry from world over.
	The employability of this programme will attract talented students from both within the state/country and outside country to join this programme.
	This Professional Post Graduate Degree Programme in Food Safety & Food Business Management will be the unique manpower (Food Business Managers with technical/food safety competency) required for the emerging food business sector in India and abroad.
Other institutes offering similar programmes	No university in India is offering any post graduate programme in this important area. International Universities offering related programmes include: MSc Advanced Food Safety (Queen's University Belfast) MSc Food Safety, Hygiene and Management (University of Birmingham - College of Engineering and Physical Sciences, Birmingham, United Kingdom) MSc Applied Food Safety and Quality Management (University of Greenwich, United Kingdom)
Expected graduate outcomes of the	What kind of career opportunities for participants if they successfully complete the course

proposed programme	The Students get placement in various domains such as HORECA industry (Hotels, Restaurants, Catering), food processing companies, spice and condiments, tea and coffee, cereals, rice, meat, seafood, food safety industries, ready to eat/ ready to prepare food industries, packaging industries, quality control organizations, food R& D and testing laboratories, food inspection agencies, food safety coaches etc and in Government bodies like FSSAI, Export Inspection Council, Food Product Development Authorities, State Food Safety Departments etc.
Partnership with Industry if any for the proposed programme	Yes. HORECA industry (Hotels, Restaurants, Catering), Food processing and Seafood processing industries.
Partnership with foreign universities if any for the proposed programme	University of Pozega, Croatia
Number of seats in the proposed programme (Minimum 25)	20
Proposed fees for the proposed programme	
Additional Infrastructural requirements if any needed for the proposed programme	Please keep it to the bare minimum

PG PROGRAMME-2

Name of the proposed Programme	M.Sc. INDUSTRIAL FISHERIES WITH SPECIALIZATION IN **FISH PROCESSING TECHNOLOGY**
Nature of the programme proposed	Modification of the existing PG programme (MSc Industrial Fisheries)
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	4 Semesters
Description of the programme proposed	The School of Industrial Fisheries, established in 1976, has been functioning with the mandate of man power development in applied fisheries, pursuing research and development activities in contemporary and confronting issues in fisheries sector. The school has been conducting two professional post graduate courses in fisheries viz., M.Sc. Degree in Industrial Fisheries and Master of Fisheries Science (M.F.Sc.) in Seafood Safety and Trade. Periodic revisions of their curricula have been implemented depending on the changing "academic, research and industrial requirements" within the country and abroad.

	In line with guidelines of NEP, the school is proposing modification of the existing Masters program, with three specializations" (i) M.Sc. Industrial Fisheries *with specialization in Fish Processing Technology*". The programme will be conducted in 4 semesters, with first two semesters devoted to fundamental principles and theoretical aspects while third and fourth semesters will be offered for research and industrial training. Incumbent students with 4 year BSc or BFSc will be directly admitted to third semester. This program is best suitable for graduates in fisheries who wish to complement their knowledge with advanced learning in fish processing technology. The course is designed to empower them to gain in-depth theoretical knowledge with practical skills and work experience in front line technological advancement in fish processing and quality control that will mould them to serve industry and also to develop entrepreneurship skills.
Justification for launching the programme proposed	Fish and fishery products are highly traded with more than 37 percent of total fish production entering international trade as various foods and products. Trade in fish and fishery products plays an important role in improving food security and contributes to meeting nutritional needs. Food safety and health risk management should be considered as a core competence in the competitiveness of developing countries, especially in the context of trade in high-value food products. To cater to these needs, trained manpower is highly warranted for monitoring handling, processing, transporting and assuring quality in seafood. The need for skilled and trained technicians and managers in seafood business sector has been increasing and supply of such competent manpower from academic institutions has been insufficient for quite some time. Alumni's of the existing programmes are working in the industry as CEO's. GMs, Managers & food safety team leaders in Food business, seafood business, entrepreneurs; aquaculture industry, seafood processing industries both in India and abroad, National Government bodies such as FSSAI, Export Inspection Council, Marine Products Export Development Authorities, NABARD, agricultural officers in banks, Scientists in Indian Council of Agricultural Research institutes (CMFRI, CIFT etc), National fisheries institutes, Private food testing & research labs, State fisheries departments, MATSYAFED etc. The existing programme is trans/multidisciplinary and the post graduates are covering Science, Technology, and Social Science subjects in each semester and are moulded as the specialized manpower for the fisheries industry. Inorder to meet the

	emerging challenges and to give wider acceptance/edge in the job markets particularly in the specialized industries of the fisheries sector, the school propose to modify the existing M.Sc. Industrial Fisheries with three specializations.
Other institutes offering similar programmes	No universities or colleges in India is offering MSc degree in Industrial Fisheries or with single or dual specializations. ICAR accredited universities including KUFOS offering Master of Fisheries Science with specializations in Aquaculture, Fish Processing Technology, Fish Health, Fishery Engineering, Fisheries Resource Management and Fisheries Economics.
Expected graduate outcomes of the proposed programme	Students who complete the course will be able to serve seafood industry at middle and top level management as managers, executives, technologists, quality auditors, marketing executives etc.
Partnership with Industry if any for the proposed programme	Seafood processing industry through Seafood Exporters Association of India
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	10 (Existing PG programme MSc Industrial Fisheries started in the year 1976 and the demand ratio is high. In order to cope-up with the changing scenario in the job markets and also to meet the demand from the industries, school proposes to divide the programme into three MSc Industrial Fisheries with specializations in (i) Fish Processing Technology- 10 seats; (ii) Sustainable aquaculture- 10 seats and (iii) Fisheries Resource Management – 10 seats. The students can opt single or dual specializations during their study.
Proposed fees for the proposed programme	Rs. 15000/- per semester (Existing fee is Rs.5,000/- per semester).
Additional Infrastructural requirements if any needed for the proposed programme	Three year graduates need to undergo full four semesters with fundamental papers in the first two semesters. Existing four year BFSc graduates of KUFOS/CUSAT/Agricultural University/ICAR and the expected four year BSc graduates through NEP can join the masters degree with single or dual degree specializations from third semester onwards.

PG PROGRAMME-3

Name of the proposed Programme	M.Sc. INDUSTRIAL FISHERIES WITH SPECIALIZATION IN FISHERIES RESOURCE MANAGEMENT

Nature of the programme proposed	Modification of the existing PG programme (MSc Industrial Fisheries)
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	4 Semesters
Description of the programme proposed	The School of Industrial Fisheries, established in 1976, has been functioning with the mandate of man power development in applied fisheries, pursuing research and development activities in contemporary and confronting issues in fisheries sector. The school has been conducting two professional post graduate courses in fisheries viz., M.Sc. Degree in Industrial Fisheries and Master of Fisheries Science (M.F.Sc.) in Seafood Safety and Trade. Periodic revisions of their curricula have been implemented depending on the changing "academic, research and industrial requirements" within the country and abroad. In line with guidelines of NEP, the school is proposing a new Masters program," M.Sc. Industrial Fisheries with specialization in Fisheries Resource Management". The course will be conducted in 4 semesters, with first two semesters devoted to fundamental principles and theoretical aspects while third and fourth semesters will be offered for research and industrial training. Incumbent students with 4 year BSc (Hons) will be directly admitted to third semester. This program is best suitable for graduates in fisheries who wish to complement their knowledge with advanced learning in fisheries and aquaculture. The course is designed to empower them to gain in-depth theoretical knowledge with practical skills and work experience in front line technological advancement in fisheries that will mould them to serve industry and also to develop entrepreneurship skills.
Justification for launching the programme proposed	Fisheries a significant economic activity that supports the life of a considerable part of rural population, besides contributing to ever-growing demand for food through capture fishery production. However, fisheries sector in the country has been facing challenges posed by anthropogenic factors; habitat modification, over exploitation, environmental pollution, etc. in addition to natural calamities and climate change driven factors. Low productivity from capture fisheries in both marine and inland water bodies have been grave issues pertaining in the country. Therefore, scientists, policy makers and academia propose sustainable fisheries management which, however, requires large force of academically trained manpower. To cater to the urgent need of developing competent human resource in sustainable fisheries resource management, the School of Industrial Fisheries is

	proposing modification of existing programme with three specializations. Alumni's of the existing programmes are working in the industry as CEO's. GMs, Managers & food safety team leaders in Food business, seafood business, entrepreneurs; aquaculture industry, seafood processing industries both in India and abroad, National Government bodies such as FSSAI, Export Inspection Council, Marine Products Export Development Authorities, NABARD, agricultural officers in banks, Scientists in Indian Council of Agricultural Research institutes (CMFRI, CIFT etc), National fisheries institutes, Private food testing & research labs, State fisheries departments, MATSYAFED etc. The existing programme is trans/multidisciplinary and the post graduates are covering Science, Technology, and Social Science subjects in each semester and are moulded as the specialized manpower for the fisheries industry. Inorder to meet the emerging challenges and to give wider acceptance/edge in the job markets particularly in the specialized industries of the fisheries sector, the school propose to modify the existing M.Sc. Industrial Fisheries with three specializations. **M.Sc. Industrial Fisheries with specialization in Fisheries Resource Management**, in line with the guidelines of National Educational Policy.
Other institutes offering similar programmes	No universities or colleges in India is offering MSc degree in Industrial Fisheries or with single or dual specializations. ICAR accredited universities including KUFOS offering Master of Fisheries Science with specializations in Aquaculture, Fish Processing Technology, Fish Health, Fishery Engineering, Fisheries Resource Management and Fisheries Economics.
Expected graduate outcomes of the proposed programme	Students who complete the course will be able to serve as executives, technologists, scientists, fishery managers, extension officers, resource surveyors, fish harvest industry managers and fishery conservation specialists and administrative officers etc.
Partnership with Industry if any for the proposed programme	Fishing industry
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	10 (Existing PG programme MSc Industrial Fisheries started in the year 1976 and the demand ratio is high. In order to cope-up with the changing scenario in the job markets and also to meet the demand from the industries, school proposes to divide the programme into three MSc Industrial Fisheries with specializations in (i) Fish Processing Technology- 10 seats; (ii) Sustainable aquaculture- 10 seats and (iii) Fisheries Resource Management – 10 seats. The

	students can opt single or dual specializations during their study.
Proposed fees for the proposed programme	Rs. 15000/- per semester (Existing fee is Rs.5,000/- per semester).
Additional Infrastructural requirements if any needed for the proposed programme	Additional class room Three year graduates need to undergo full four semesters with fundamental papers in the first two semesters. Existing four year BFSc graduates of KUFOS/CUSAT/Agricultural University/ICAR and the expected four year BSc graduates through NEP can join the masters degree with single or dual degree specializations from third semester onwards.

PG PROGRAMME-4

Name of the proposed Programme	M.Sc. INDUSTRIAL FISHERIES WITH SPECIALIZATION IN **SUSTAINABLE AQUACULTURE**
Nature of the programme proposed	Modification of the existing PG programme (MSc Industrial Fisheries)
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	4 Semesters
Description of the programme proposed	The School of Industrial Fisheries, established in 1976, has been functioning with the mandate of man power development in applied fisheries, pursuing research and development activities in contemporary and confronting issues in fisheries sector. The school has been conducting two professional post graduate courses in fisheries viz., M.Sc. Degree in Industrial Fisheries and Master of Fisheries Science (M.F.Sc.) in Seafood Safety and Trade. Periodic revisions of their curricula have been implemented depending on the changing "academic, research and industrial requirements" within the country and abroad. In line with guidelines of NEP, the school is proposing modification in the existing Master's program," M.Sc. Industrial Fisheries with specialization in Sustainable Aquaculture". The course will be conducted in 4 semesters, with first two semesters devoted to fundamental principles and theoretical aspects while third and fourth semesters will be offered for research and industrial training. Incumbent students with 4 year BSc (Hons) will be directly admitted to third semester. This program is best suitable for graduates in fisheries who wish to complement their knowledge with advanced learning in fisheries and aquaculture. The course is designed to empower them to gain in-depth theoretical

	knowledge with practical skills and work experience in front line technological advancement in aquaculture that will mould them to serve concerned industry and also to develop entrepreneurship skills.
Justification for launching the programme proposed	School of Industrial Fisheries has been successfully conducting two multi-disciplinary Masters Programmes. The school serves as a main source of trained manpower for many fisheries establishments, especially seafood and aquaculture companies in India and overseas. The entrepreneurial skills acquired from these programmes have given confidence to its post graduates to venture into their own business in different facets of fisheries. With its high academic and teaching reputation, the school is proposing modification in the existing masters program. Alumni's of the existing programmes are working in the industry as CEO's. GMs, Managers & food safety team leaders in Food business, seafood business, entrepreneurs; aquaculture industry, seafood processing industries both in India and abroad, National Government bodies such as FSSAI, Export Inspection Council, Marine Products Export Development Authorities, NABARD, agricultural officers in banks, Scientists in Indian Council of Agricultural Research institutes (CMFRI, CIFT etc), National fisheries institutes, Private food testing & research labs, State fisheries departments, MATSYAFED etc. The existing programme is trans/multidisciplinary and the post graduates are covering Science, Technology, and Social Science subjects in each semester and are moulded as the specialized manpower for the fisheries industry. Inorder to meet the emerging challenges and to give wider acceptance/edge in the job markets particularly in the specialized industries of the fisheries sector, the school propose to modify the existing M.Sc. Industrial Fisheries with three specializations. MSC Industrial Fisheries with specialization in Sustainable Aquaculture, in line with New Educational Policy. By completing this present specialization, the students will be able to undertake executive and administrative services in aquaculture industry. The students will also be trained for develop entrepreneurship skills in fin fish and shell fish seed production, sustainable aquaculture activities and fish food business opportunities.
Other institutes offering similar programmes	No universities or colleges in India is offering MSc degree in Industrial Fisheries or with single or dual specializations. ICAR accredited universities including KUFOS offering Master of Fisheries Science with specializations in Aquaculture, Fish Processing Technology, Fish Health, Fishery Engineering, Fisheries Resource Management and Fisheries Economics.

Expected graduate outcomes of the proposed programme	Students who complete the course will be able to serve in the global aquaculture industry at different levels as executives, technologists, farm managers, hatchery technicians, hatchery managers, fish feed technologists, marketing executives, and R&D personnels.
Partnership with Industry if any for the proposed programme	Aquaculture industry Fish seed hatcheries Fish feed industry Ornamental fish industry Cage culture industry
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	10 (Existing PG programme MSc Industrial Fisheries started in the year 1976 and the demand ratio is high. In order to cope-up with the changing scenario in the job markets and also to meet the demand from the industries, school proposes to divide the programme into three MSc Industrial Fisheries with specializations in (i) Fish Processing Technology- 10 seats; (ii) Sustainable aquaculture- 10 seats and (iii) Fisheries Resource Management – 10 seats. The students can opt single or dual specializations during their study.
Proposed fees for the proposed programme	Rs. 15000/- per semester (Existing fee is Rs.5,000/- per semester).
Additional Infrastructural requirements if any needed for the proposed programme	Additional classroom- 1 No Three year graduates need to undergo full four semesters with fundamental papers in the first two semesters. Existing four year BFSc graduates of KUFOS/CUSAT/Agricultural University/ICAR and the expected four year BSc graduates through NEP can join the masters degree with single or dual degree specializations from third semester onwards.

CERTIFICATION COURSE-1

Name of the proposed Programme	Export/Import Documentation for Seafood Industry
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline/Online
Duration of the programme proposed	3 months
Description of the programme proposed	The course will impart knowledge on formalities that support the local economy and the workforce needs of the export sector of the country by adhering to fundamental

	principles, law, and regulations. The core areas of export documentation programmes are listed below. *INCO Terms, Export Documentation Formalities* *Establishing an organization, opening a Bank Account, Obtaining Permanent Account Number (PAN), Obtaining Importer-Exporter Code (IEC) Number, Registration cum membership certificate (RCMC), Selection of product-Markets - Buyers.* *Export Procedure and Documentation, Documents Required for Exporting, Execution of Export Order, Formalities by a Forwarding Agent, Foreign Exchange Formalities, Realisation of export proceeds, Export benefits and schemes, Documentation for realisation of export benefits. Record Keeping and File Management.*
Justification for launching the programme proposed	Seafood business is considered to be the 'sunrise sector' and is contributing towards the export growth of the country. The average annual growth was constantly increasing for quantity and value of export. About 650 seafood processing units working across the country are involved in seafood export business. However, there is a dearth of specialised manpower to meet the export segment of the industry in terms of facilitating the export documentation formalities. Any graduate from recognised universities can be join the programme. Seafood Industry sponsored candidates can also join
Other institutes offering similar programmes	IIM offers general programmes and online courses in Export/Import Documentation, however there is no specialised programme with reference to seafood
Expected graduate outcomes of the proposed programme	On completing this course, the student will be • specialized in export documentation, capable of taking charge of seafood export activities • capable of supervising the creation of commercial documents compatible with seafood export • capable of managing recordkeeping facilitating prompt realisation of proceeds and other benefits.
Partnership with Industry if any for the proposed programme	Seafood Export Industry
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs 10,000/-

Additional Infrastructural requirements if any needed for the proposed programme	Nil

CERTIFICATION COURSE-2

Name of the proposed Programme	CERTIFICATE COURSE IN FISHERIES ANALYTICS
Nature of the programme proposed	certification
Mode of delivery of the programme proposed	Online / Hybrid
Duration of the programme proposed	6 MONTHS
Description of the programme proposed	Fisheries Analytics will be focusing on training of workforce in gathering, managing, reviewing, analyzing and prediction of fishery data to be used for decision making in the fisheries industry. The certification programme will equip the participants in getting necessary skillsets so that they can use the data effectively for decision making in the industry. Additionally, this program will be dealing with quantitative modelling and review information needs for the management of fisheries industry.
Justification for launching the programme proposed	Along with its more recent offshoots in the fisheries industry, fisheries data analysis, AI applications and Deep Learning in fisheries and related business in the fisheries sector have been of great importance. For the expansion of data analytics in this industry, it is the need of the hour to think how these developments are can be made useful for the fisheries segment. It has also been noted that for such analytics to succeed, a trained workforce is also required.
Other institutes offering similar programmes	-
Expected graduate outcomes of the proposed programme	Certificate holders will be able to analyse the fisheries data effectively with modern analytical tools. Certificate holders will be able to apply analytical models for decision making in the fisheries industry. Certificate holders will be able to use data for predictive modelling in the fisheries industry.
Partnership with Industry	Fisheries industry

if any for the proposed programme	
Partnership with foreign universities if any for the proposed programme	Probing the possibility
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the programme	Rs. 10,000/-
Additional Infrastructural requirements if any needed for the proposed programme	A full fledged computer laboratory required with 25 computers installed with analytical softwares.

CERTIFICATION COURSE-3

Name of the proposed Programme	CERTIFICATE PROGRAMME IN SUSTAINABLE FISH FARMING
Nature of the programme proposed	certification program
Mode of delivery of the programme proposed	Offline/ Hybrid
Duration of the programme proposed	3 months
Description of the programme proposed	Aquaculture has been globally accepted as an economically viable food production practice. It has widely been promoted thanks to its ability in boosting fish production and uplift of rural folk marginal income. More often aquaculture activities focus on industrial aquaculture. However, principles of sustainable fish farming practices can be recommended for the benefit of rural people. Therefore, low intensity marginal farming practices need to be propagated so that such practices can be adopted by large section of population. In this back ground, the present certificate programme in sustainable fish farming is proposed with following objectives. 1. To develop awareness on principles of sustainable aquafarming 2. To understand methods of low intensity, marginal fish farming practices 3. To undertake practices of backyard farming methods 4. To develop entrepreneurship among students 5. To empower them to propagate the principles of sustainable fish production practices among rural folk
Justification for launching the programme proposed	At present, aquaculture is being learnt by undergraduate or post graduate fisheries students, however, fish farming is being actively taken up by farmers who receive no formal

	training in aquaculture practices. Large section of such people is being guided by methods and practices adopted in industrial aquaculture practices which often lead to operational failures and consequent adversities. This programme is targeting candidates with no formal education in fisheries.
Other institutes offering similar programmes	Infrequent training programs conducted by Governmental agencies
Expected graduate outcomes of the proposed programme	The programme is envisaged so as to empower the candidates to undertake fish production through sustainable aquaculture. It is also expected to develop skills among women folk in adopting backyard fish farming.
Partnership with Industry if any for the proposed programme	Aquaculture industry
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs 5000/-
Additional Infrastructural requirements if any needed for the proposed programme	Nil

2.27 SCHOOL OF LEGAL STUDIES

PG PROGRAMME-II

Name of the proposed Programme	**ONE YEAR LL.M. (Regular-Evening)**
Nature of the programme proposed	Modification of existing Programme
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed proposed	One Year with additional 06 months for Dissertation Work
Description of the program proposed	A brief note on the content of the programme (Max 500 words) The programme can offer one year LL.M. for professionals who have at least five years of practice. The LL.M in evening stream will be limited to any one or two specialized areas of public law like Human Rights, Constitutional Law and Criminal Law etc. The program can be integrated with the programmes on other streams and can make it as dual degree. The programme will offer focused learning opportunities for the practitioners.
Justification for launching the programme proposed	Institution already has Evening LL.B. Programme. The program enables the use available facilities without affecting the day schedule. Practising lawyers, working professionals with LL.B. qualification etc. can have LL.M. through this programme. The programme can be used to integrate with twining degrees. The programme can be also linked with dual degree programs for the aspirants. Opportunity for practising lawyers for furthering their learning can be envisaged through this initiative.
Other institutes offering similar programs	Panjab University, and most of the foreign universities offers similar programme.
Expected graduate outcomes of the proposed programme	Professionals can have more expertise with the course in the area of law. The course can train students to appear for competitive examinations.
Partnership with Industry if any for the proposed programme	NIL

Partnership with foreign universities if any for the proposed programme	Twining degree can be integrated with this course for selected students to identify ideal foreign institutions.
Number of seats in the proposed programme (Minimum25)	25
Proposed fees for the proposed programme	65,000/- per semester
Additional Infrastructural requirements if any needed for the proposed programme	Additional infrastructure is not required except the minimum workforce to handle the office during evening hours.\n\nSmart Classroom facilities required.

PG PROGRAMME-2

Name of the proposed Programme	**LLM MFC /MBA (Law) Integrated**
Nature of the programme proposed	New degree (Dual Degree)
Mode of delivery of the programme proposed	Offline (Evening)
Duration of the programme proposed	3 Years
Description of the programme proposed	The LLM MBA (Law) is an offline, intensive double degree programme offering working professionals the opportunity to expand their knowledge base with a comprehensive MBA and advanced legal studies while remaining employed on a full-time basis. This postgraduate program provides the flexibility needed for career progression.\n\nThis program is designed for practicing lawyers who aspire to augment their business and management acumen and proficiency, while also expanding their comprehension of advanced legal subjects. Additionally, it caters to executives who lack a legal background but desire to enhance their business and management expertise, as well as augment their comprehension of legal concepts and topics.

Justification for launching the programme proposed	Law and business have become increasingly intertwined. As society progresses, lawyers must know more about business strategies, finance, marketing, operations, human resource management, organizational behavior, associated risks and numerous compliance regulations. There has been a growing trend of companies hiring legal professionals to act as CEOs or assume other types of commercial roles, particularly in highly regulated industries.
Other institutes offering similar programmes	1. Northeastern University 2. University of Pennsylvania Carey Law 3. School University of New South Wales 4. National Law School Of India University, Bengaluru 5. IIT Kharagpur, 6. IIT Delhi 7. Indian Institute of Management (IIM) Bangalore 8. Symbiosis Institute of Business Management (SIBM) 9. Indian Institute of Management (IIM) Ahmedabad 10. Praxis Business School Kolkata 11. Indian Institute of Management (IIM) Kolkata 12. NMIMS University Mumbai 13. Vellore Institute of Technology (VIT)
Expected graduate outcomes of the proposed programme	What kind of career opportunities for participants if they successfully complete the course
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	15,00,000/-
Additional Infrastructural requirements if any needed for the proposed programme	Smart Classroom, A/C, Furniture

CERTIFICATION COURSE-1

PROPOSAL FOR A CERTIFICATION COURSE Dr. Binu Mole K	
Name of the proposed programme	Certificate Conciliation Course in Maritime Arbitration
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	30 hours
Description of the programme proposed	The Certificate Course in Maritime Arbitration is designed to equip participants with the knowledge and skills required to excel in the specialised field of maritime dispute resolution. Maritime arbitration plays a crucial role in resolving various complex commercial and legal disputes related to maritime industry. This course provides an understanding of principles, procedures, law and practices of maritime arbitration, making an essential choice for professionals and students looking to enhance their expertise in this field. The objectives of the programme include: ◆ Understand the historical and legal context of maritime arbitration. ◆ Learn about the arbitration process, selection of arbitrators, and the conduct of arbitration proceedings. ◆ Drafting of Arbitration Agreements, Arbitration Clauses, and essential requirements. ◆ Recognition and Enforcement of Arbitral Awards ◆ Horn your skills in Maritime Conciliation by gaining insights on related International & National rules /guidelines
Justification for launching the programme proposed	Arbitration and Conciliation is widely accepted method for resolving maritime complex and commercial disputes. There is growing demand due to lack of skilled professionals who can effectively navigate this niche area of law. Since specialized nature of maritime arbitration demands a deep understanding of maritime law, industry dynamics, and the intricacies of arbitration procedures existing legal and industry professionals need exposure in comprehensive training in this field. The certificate course can also serve to acquire expertise in maritime arbitration offer prospects for career advancement considering global

	nature of maritime trade. Further this course can provide participants with the knowledge and certification needed to excel in law firms, shipping companies, maritime organizations, and governmental bodies involved in maritime policy and regulation. The Programme will be best suited for: ● Legal professionals seeking specialization in maritime arbitration. ● Law students and recent graduates interested in maritime law and dispute resolution. ● Professionals working in the maritime industry, including shipowners, operators, and managers. ● Government officials involved in maritime policy and regulation.
Other institutes offering similar programmes	Gujarat National Law University, Chartered Institute of Arbitrators, Informa, Lloyds Maritime Academy, London
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of fresh graduates and legal/Maritime/Regulatory bodies.
Partnership with Industry if any for the proposed programme	Arbitration Institutions
Partnership with foreign universities if any for the proposed programme	Will Explore
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs.10000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERIFICATION COURSE-2

Name of the proposed Programme	TECHNOLOGICAL ADVANCEMENT IN ACCOUNTING - TALLY
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Offline/Online
Duration of the programme proposed	60 hours
Description of the	'Tally' is a comprehensive ERP software that goes far beyond the basic functionalities of

programme proposed	finance and accounts. It encompasses all critical aspects of an organisation, including payroll, inventory, manufacturing and banking. Tally. ERP9 optimizes an organisation's various operations and divisions, streamlines every aspect, and brings together its functioning into a cohesive whole. Over the years, Tally has become synonymous with accounting and accounting is nothing but maintaining different books of accounts. Thus, this certificate programme was envisaged and is being delivered for the benefit of aspiring accounting professionals and students in the Finance and Accounting streams. The knowledge of Accounting software Tally which is very essential in interpreting the accounting language with utmost ease and efficiency. Emerging Technological has transformed the Accounting Profession towards a new era of advancement. The object of the course is to uplift the upcoming young accountant towards the world of technology by enhancing accountant's ability to analyze statistical values and also to improve their judgement and critical thinking skill. The shift in dynamic accounting technology, accounting software programs are becoming more automated and the role of the accountant is changing to that of a business advisor.
Justification for launching the programme proposed	● **Focus Area** The Course focuses on various areas of accounting, billing, payroll, banking, taxation, inventory etc which will enable the students to buildup bright career in accounting. Tally is an accounting software that is very much useful in making calculations in small and mid-level businesses. It usually stands for Transactions Allowed in Linear Line Yards. It helps to do all the Banking, Auditing and Accounting Works using this software. Tally's accounting features permit to record business transactions instantly and easily. Record transactions necessary for business by creating and maintaining vouchers, masters and generating reports. It helps to manage all the major

216

	accounting operations in the business. ● Tally ERP Course can be learned within 2 months. Basic understanding of Accounting concepts and Tally will be included in the first month and in the second month advanced concepts like GST, TDS, Service Tax Payroll, etc. will be included. The courses will be delivered using Offline/Online platforms.
Other institutes offering similar programs	MG University, Online courses in Coursera and Udemy
Expected graduate outcomes of the proposed programme	It is an industry oriented training program, designed to competently prepare candidates in the fine aspects to make a suitable entry into the corporate world. The Tally certification enables the student to become an expert accounting professional in the shortest possible time. And, since Tally is currently used across diverse segments like MNCs, government & local businesses, job opportunities with the best companies in the country are immensely enhanced. Job Opportunities and Career Prospects ● Accountant ● Accounts Executive ● Tally Operator ● Tally Accounts Manager ● Service Coordinate with Tally ● Tally Junior Accountant ● Tax Accountant ● Accounting Assistant ● Supervisory Accountant
Partnership with Industry if any for the proposed programme	TALLY Institutes
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum25)	30
Proposed fees for the proposed programme	Rs10,000
Additional Infrastructural requirements if any needed for the proposed programme	Learning Resources & Equipments TALLY Software

CERTIFICATION COURSE/ VALUE ADDED PROGRAMME

Name of the proposed Programme	**Certificate Programme on Professional Skills in Advocacy**
Nature of the programme proposed	**Certification programmes/value-added programme**
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	50 Hours/3 Months
Description of the programme proposed	The programme aims to train the upcoming lawyers with professional skills. Training in skill of advocacy, drafting, interpretation and basic knowledge on professional skills. The training will be given to selected number of students within and outside the School. The focus of the programme will be to train the outgoing students with professional skills. Expert lawyers, judges and academicians will be training the students. A set of seats can be reserved for the students within the University. Students who have completed their VI semester or IV semester course in five year or three year LLB programme respectively can be admitted to this course.
Justification for launching the programme proposed	This will be a programme helpful for the students of law to get trained on professional skills before getting courtroom experience. This will also help them to prepare for judicial service examinations.
Other institutes offering similar programmes	National Law Schools have similar training programmes
Expected graduate outcomes of the proposed programme	What kind of career opportunities for participants if they successfully complete the course
Partnership with Industry if any for the proposed programme	**SLS CUSAT ALUMNI Association have the plan to run a similar programme which will be of great help to run the same with their expertise.**

Partnership with foreign universities if any for the proposed programme	NA
Number of seats in the proposed programme (Minimum25)	45-50
Proposed fees for the proposed programme	₹8000 for outside CUSAT students and ₹4000 for CUSAT students
Additional Infrastructural requirements if any needed for the proposed programme	Specific infrastructure requirements may not be required except facilities for recording of few lecture sessions. Staff support may be required.

CERTIFICATION PROGRAMME/ MOOC COURSE

Name of the proposed Programme	Certificate Programme/MOOC Course on Intellectual Property and Innovation
Nature of the programme proposed	Certification Programme/MOOC Course
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	One Semester
Description of the program proposed	Intellectual Property had taken the world by storm. The impact that IP has had on the world is tremendous. Not only has IP fuelled innovation but also has paved the way for economic progress. It is a very interesting story to examine the evolution of IP in the form that we see today, the catalystic effect that it has had on innovation and technology. Various domains/ sectors have benefited from IP. Legal and Regulatory Framework, though has come into place, still suffers from shortcomings. Efforts are still on at international and national levels to plug the gaps and to march ahead. This programme would attempt at exploring the various facets of IP and its impact on the realm of innovation and scientific advancements. This would also touch upon the legal and regulatory regime related to IPatthe Indian and international levels.
Justification for launching the programme proposed	Intellectual Property is a hotbed in the contemporary world fuelling development and boosting economies. The scope of the domain is unlimited and is expected to

	grow even bigger. This programme would not only provide insights into the realm but also open the world to curious minds and bright intellects. Opportunities are aplenty and industrial collaborations are a practical advantage.
Other institutes offering similar programmes	There are Law Schools and Research Centres offering similar programmes across the world. However, a customised course/programme catering to a variety of beneficiaries (academia, industry, practitioners etc.) would succeed.
Expected graduate outcomes of the proposed programme	To create a vivid understanding of the theoretical and practical realm of intellectual property and its contemporaneity and relevance in the modern world fuelled by the quest for economic growth and profits; and the legal and regulatory framework of this domain.
Partnership with Industry if any for the proposed programme	Yes
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum25)	30
Proposed fees for the proposed programme	Rs.10,000/-
Additional Infrastructural requirements if any needed for the proposed programme	Audio-Visual Studio Support

CERTIFICATION PROGRAMME MOOC

Name of the proposed Programme	Certificate programme MOOC
Nature of the programme proposed	Certificate programme MOOC
Mode of delivery of the programme proposed	Hybrid mode
Duration of the programme proposed	
Description of the programme proposed	The certificate programme on Medico Legal Evidence and the Criminal Justice Process is designed to provide the students with a comprehensive understanding of the scientific advancements in criminal investigation and its evidentiary value and admissibility in the criminal trial. The Course content comprise of the relevance of forensic science in criminal justice system. The role of medical evidence in investigation

	under the Criminal Justice process. The course covers the foundational principles of Forensic Science, forensic techniques that are adopted and their application in criminal investigation and admissibility. The role of the Judiciary in appreciation of medical evidence and the legal standards that are adopted for the admissibility of the medical evidence. The challenges to forensic evidence in court and the recent developments in admissibility standards. The Course is designed to impart knowledge on the legal aspects of forensic evidence. The Course also intends to provide understanding of the basic principles of medical jurisprudence and the ethical and social issues of medical evidence in criminal cases, The Course has the potential to examine the privacy concerns in DNA data base and the controversies and ethical dilemmas in forensic evidence. The Course equips the students with the knowledge and skills necessary to bridge the gap between medicine and law.
Justification for launching the programme proposed	The intersection of medicine and law has become increasingly prominent in recent years. One area where this convergence is particularly critical is the use of Medical evidence in Criminal Justice process. The market viability of such an academic programme is underpinned by a growing demand for professionals who possess expertise in this field. Both legal and medical practitioners require a deep understanding of the complex issues surrounding medical evidence in criminal cases. The increased number of wrongful convictions and the role played by flawed medical evidence has led to a greater emphasis on the importance of scientifically sound medical evidence in the criminal justice system. Above all the program adopts a typically multidisciplinary approach drawing on both legal and medical fields. The market viability is further enhanced by the diverse career opportunities it offers. Partnering with experts in the field can help shape the curriculum to meet the

	real-world needs. Students pursuing graduation in law, medicine, doctors, nurses, Legal professionals, students holding bachelor's degree in Science with Zoology, Botany, Chemistry or Biotechnology can join for this programme.
Other institutes offering similar programmes	
Expected graduate outcomes of the proposed programme	The Participants have a wide range of career prospects like Forensic medical examiner or forensic pathologists, Forensic nurses, Forensic Psychologist, Legal Consultant, Crime Scene Investigator, Legal Researcher or Academician.
Partnership with Industry if any for the proposed programme	No
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme (Minimum 25)	Total No of seats=60. Student intake will be 30 students each in 2 batches.
Proposed fees for the proposed programme	Rs. 2500/- per student
Additional Infrastructural requirements if any needed for the proposed programme	Please keep it to the bare minimum

CERTIFICATION PROGRAMMES/MOOC PROGRAMMES

Name of the proposed Programme	Sustainable Development Law, Policy, and Governance
Nature of the programme proposed	**Certification Programmes/MOOC Programmes**
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	One Semester
Description of the programme proposed	This course would contain five modules of recorded instruction along with live classroom interaction on G-Meet and Personal Contact Programme. Students will be assigned appropriate independent work including completing required readings, exploring recommended resources, submitting of assignments, and attending internal assessments. The course will provide the learners with the concept, emerging approaches and frameworks of

	sustainable development law. The course will delve in to the concept of sustainability, different pillars of sustainable development, Brundtland report and various initiative of the United Nations on sustainable development, Sustainable Development Goals, CSR, ESG etc and case studies. The course will introduce learners to the relevance of sustainable development law and governance and help them critically analyse how sustainable development is reflected in law and governance worldwide. The course will explore the key challenges, solutions, and the role of law, policy and governance in scaling up the application of sustainable development principle and the implementation of its different hades like Corporate Social Responsibility (CSR), Sustainable Development Goals (SDGs) and Environmental, Socialand Governance (ESG) etc. in India. The approach of the Indian judiciary towards the concept of sustainable development is examined in this course with the help of relevant case laws.
	The contact classes would be conducted at SLS,CUSAT and interactive session will be conducted by experts from partnering institutions. Each module shall Consist of three recorded teaching hours apart from interactive sessions and contact classes.The duration of the course would be six months and the maximum period for completion of the course would be one year with additional fee of 5000 for extended period of six months after which the admission stands automatically cancelled and would require fresh enrolment.

Justification for launching the programme proposed	Sustainable development concept being an expansive and relevant topic that touches upon all walks of our life, the proposed course is highly expected to draw sufficient number of students from different disciplines and services.

Graduate students, government servants, corporate board members and employees and other working professionals.

University admission criteria may be applied here also with graduation in any discipline from a recognized university as minimum qualification without any age bar. |
| Other institutes offering similar programmes | Not exactly, but similar courses relating to sustainable development are being offered in different online platform slike Coursera and Udemy. |
| Expected graduate outcomes of the proposed programme | The learners will understand how sustainable development law operates at the national and international levels.

They will learn the role of institutions like the UN, regional organizations, and national governments in shaping and implementing sustainable development policies and laws.

They will understand the legal and policy frame works that govern trade, investment, and finance in the context of sustainable development along with CSR and ESG.

The learners will be able to critically analyse the potential benefits and risks of public-private partnerships and other innovative approaches to sustainable development from an environmental, social and ecological perspective.

They will be able to assess the challenges and opportunities of aligning national and sub-national policies and human right concerns with the SDGs.

Thus, learners will acquire specialist and analytical knowledge of sustainable |

	development law, policy and governance at the international, national and local level. This enhanced understanding will help them to critically think and apply their knowledge and skill for better application of the concept of sustainable development for improved professionalism and decision making across different sectors.
Partnership with Industry if any for the proposed programme	Partnership with KILA for learning localisation of Sustainable Development Goals in Kerala. Partnership with companies like Federal Bank, Kerala Enviro Infrastructure Ltd. And Manappuram Finance Ltd. to learn about CSR activities as case studies. Partnership with SEBI to learn about ESG disclosure and rating. Partnership with NABARD to learn their contributions towards equitable and inclusive development.
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	30
Propose fees for the proposed programme	₹10000
Additional Infrastructural requirements if any needed for the proposed programme	Audio Visual Studio Support.

MOOC COURSE-1

Name of the proposed Programme	Certificate in Intellectual Property Rights
Nature of the programme proposed	MOOC
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	3 months

Description of the programme proposed	The course will introduce students to the various forms of intellectual properties thatare protected in India and internationally. The course will touch uponthe basics of copyright, patents, trademarks, industrial designs, trade secrets, geographical indications among other forms of IP. The course would be open to graduates of all disciplines and easily accessible to students with no background in technology or law.
Justification for launching the programme proposed	Rising market demand of knowledge on IP and morecareer options with person who have IP degree. As the programme is open to all graduates it will help them specialize in those forms of IP will is related to their field of study.
Other institutes offering similar programmes	FICCI, Symboisis, various foreign universities, platforms like Coursera, lawsikho,etc
Expected graduate outcomes of the proposed programme	The course will provide basic understanding of IP system in India. Help participants to identify and apply various forms of IP in their line of work. Thus this programme becomes an Add-On to their existing academic qualification.
Partnership with Industry if any for the proposed programme	
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	₹3000
Additional Infrastructural requirements if any needed for the proposed programme	Facility to record classes within the department

MOOC COURSE-2

Name of the proposed Programme	Certificate in Patent Law
Nature of the programme proposed	MOOC
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	2 months
Description of the programme proposed	The course will introduce students to the various aspects of Patent law in India and internationally. The course will touch upon the substantive patent law comprising of patent eligibility, patentability, ownership, rights and its limitation, infringement, etcalong with procedural aspect of filing patents.
Justification for launching the programme proposed	The programme should be open from graduates from legal, scientific and technological background. As filing of patents is seen as a mark of prestige and having market edge, there has been a rise in demand for person with knowledge in patent law.This programme can cater to this need.
Other institutes offering similar programmes	FICCI, Symboisis, various foreign universities, platforms like Coursera, lawsikho,etc
Expected graduate outcomes of the proposed programme	The course will provide indept understanding of patent system in India and internationally. Will assist graduates with science and technology background to become Patent Agents, Patent examiners, etc. Thus this programme becomes an Add-On to their existing academic qualification.
Partnership with Industry if any for the proposed programme	Will have to associate with Lawyers who prosecutes patent application
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	30

Proposed fees for the proposed programme	₹5000
Additional Infrastructural requirements if any needed for the proposed programme	Facility to record classes within the department

2.28 SCHOOL OF MANAGEMENT STUDIES

PG PROGRAMME-1

Name of the proposed Programme	Integrated Programme in Management BCom/BBA. MBA
Nature of the programme proposed	Regular Integrated Post Graduate degree
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	5 years
Description of the programme proposed	An integrated five-year program in management, combining undergraduate and postgraduate studies, can offer a more comprehensive and holistic approach to preparing students for leadership roles in the business world. An integrated five-year program in management can provide a well-rounded education, earlier specialization, and a deeper skill set compared to a traditional postgraduate MBA. It offers students a cost-effective, practical, and comprehensive approach to preparing for leadership roles in the business world, making them highly competitive in the job market upon graduation. An integrated program provides more time for students to absorb and apply business knowledge, allowing for a deeper understanding of concepts and a stronger skill set by the time they graduate. Students can choose to specialize in a particular area of business early in their academic journey, allowing for a more focused and in-depth education in their chosen field. Integrated programs typically offer more opportunities for internships programs, providing students with hands-on experience and a competitive advantage in the job market. Students benefit from continuous development and support throughout their five-year program, including mentorship, career guidance, and networking opportunities. The transition from undergraduate to postgraduate studies is seamless, with students already familiar

	with the institution, faculty, and curriculum, reducing the adjustment period. **<u>Objectives and learning outcomes</u>** 1. Provide students with foundational knowledge in business and management from the beginning of their academic journey. 2. Foster the development of a wide range of skills, including leadership, critical thinking, problem-solving, communication, and entrepreneurship. 3. Ensure a seamless transition between undergraduate and postgraduate studies, allowing for continuity in learning and skill-building. 4. Offer extensive opportunities for internships, co-op programs, and real-world projects to apply classroom learning to practical situations. 5. Encourage students to think globally and expose them to international business practices and cultures. **Learning Outcomes** 1. Graduates will possess a deep understanding of core business concepts, including finance, marketing, operations, and strategy. 2. Develop leadership skills through coursework, group projects, and extracurricular activities, enabling students to lead teams and organizations effectively. 3. Instil an entrepreneurial mindset, encouraging students to identify opportunities, take calculated risks, and create innovative solutions. 4. Equip students with the ability to adapt to changing business environments, emerging

	technologies, and evolving market trends.
	5. Prepare students to work in multicultural settings, with an appreciation for global business practices and an understanding of international markets.
	6. Promote ethical and socially responsible decision-making, ensuring graduates are committed to business ethics and corporate social responsibility.
	An integrated BBA/BCom MBA program offers a unique educational experience that combines undergraduate and graduate studies, providing students with a well-rounded skill set and knowledge base. Here are some highlights of such a program: 1. **Dual-Degree Structure:** The program offers both a Bachelor of Business Administration (BBA) and a Bachelor of Commerce (BCom) as part of its undergraduate phase, followed by a Master of Business Administration (MBA) in the graduate phase. This dual-degree structure ensures that students receive a comprehensive education in business and commerce. 2. **Interdisciplinary Curriculum:** The curriculum is designed to bridge the gap between business administration and commerce, offering a rich blend of courses in areas such as finance, marketing, management, economics, and accounting. This interdisciplinary approach prepares students for a wide range of career paths. 3. **Advanced Business Courses:** The MBA phase of the program includes advanced business courses that delve deeper into subjects like strategic management, organizational behaviour, entrepreneurship, and leadership.

	Students acquire the knowledge and skills needed to excel in leadership roles. 4. **Ethical Business Practices:** The program emphasizes ethics and sustainability in business. Courses on business ethics, corporate social responsibility, and sustainable business practices are included to ensure that graduates are socially responsible leaders. 5. **Hands-On Learning:** Practical experience is a key component of the program. Students may engage in internships, co-op programs, and real-world consulting projects with local businesses, gaining valuable hands-on experience before graduating. 6. **Technology Integration:** Given the importance of technology in modern business, the program incorporates courses on data analytics, digital marketing, and information technology management to equip graduates with digital fluency. 7. **Entrepreneurship and Innovation:** The program fosters an entrepreneurial mindset, encouraging students to explore innovation and start-up opportunities. Entrepreneurship courses and access to incubators and accelerators may be offered. 8. **Mentorship and Networking:** Students benefit from mentorship programs and networking opportunities with alumni and industry professionals. These connections enhance career prospects and provide valuable guidance. 9. **Flexibility:** Some programs may offer flexibility in course scheduling, allowing students to tailor their studies to their specific interests and career goals. Part-time and online learning options may also be available.

	10. **Research Opportunities:** Students interested in research can engage in faculty-led research projects, contributing to the advancement of knowledge in business and commerce.
	11. **Capstone Projects:** The program typically culminates in a capstone project that allows students to apply their knowledge and skills to solve real-world business problems. This project serves as a portfolio piece for future job interviews.
	12. **Professional Development:** Career services and professional development workshops are integrated into the program to help students prepare for job interviews, build effective resumes, and develop strong communication and presentation skills.
	13. **Financial Aid and Scholarships:** To make the program accessible to a diverse group of students, financial aid, scholarships, and tuition assistance options may be available.
	14. **Alumni Engagement:** Graduates become part of a strong alumni network, gaining access to job placement services, networking events, and ongoing professional development opportunities.
Justification for launching the programme proposed	Integrated programme in Management is an outcome-oriented PG program by CUSAT. The course delivery will be a blend of classroom and experiential learning. It is a flexible programme with a right mix of classroom inputs, online courses and field assignments **Target Audience** The five-year Integrated Programme in Management (IPM) is the first of its kind in Kerala. It is a unique and creative programme meant for young students with managerial and leadership aspirations. Through the IPM, SMS CUSAT seeks to attract young students, and mould them as outstanding leaders through a world-class

	education. IPM is aimed at students who have passed out of class XII/Higher Secondary or equivalent from schools across India. The programme consists of 10 terms spread over a period of 5 years, with each year having 2 terms of 6 months. IPM is in two parts. The first three years build a foundation of by offering BBA/BCom, and the last two years focus on management.
	The foundation offers fundamentals of commerce/management with courses in Economics provide an understanding of the core disciplines on which the study of management is based. Also, add on courses in different streams will be incorporated so as to bring in new streams of specialisations.
Other institutes offering similar programmes	Harvard, Symbiosis IIM, Indore
Expected graduate outcomes of the proposed programme	In today's rapidly evolving business landscape, the demand for well-rounded professionals with a deep understanding of both business administration and commerce is higher than ever before. An integrated Bachelor of Business Administration (BBA) and Bachelor of Commerce (BCom) program leading to a Master of Business Administration (MBA) offers students a unique and comprehensive educational journey. Graduates of this program will possess a diverse skill set and knowledge base, equipping them to excel in various roles and industries. Here, we propose a set of graduate outcomes that encapsulate the holistic preparation this integrated program provides. Graduates of the BBA/BCom MBA program will be well-versed in the art of leadership and possess a keen strategic vision. They will demonstrate the ability to lead teams, make informed decisions, and drive organizational success through

	effective planning and execution. The program will equip graduates with a deep understanding of both business administration and commerce, fostering interdisciplinary expertise. They will bridge the gap between these two disciplines, leveraging their knowledge to solve complex business challenges. Graduates of the integrated BBA/BCom MBA program will be well-prepared to advance in their careers, taking on leadership roles, and making a significant impact in their chosen fields. The proposed graduate outcomes for an integrated BBA/BCom MBA program reflect the comprehensive and holistic education students will receive. These outcomes ensure that graduates possess not only the knowledge and skills required for success in the dynamic world of business but also the ethical and global perspective needed to be responsible and influential leaders. Graduates will be well-equipped to navigate the complexities of modern business environments and drive positive change in their organizations and communities.
Partnership with Industry if any for the proposed programme	Yet to explore
Partnership with foreign universities if any for the proposed programme	Yet to explore
Number of seats in the proposed programme (Minimum 25)	60
Proposed fees for the proposed programme	Rs. 1 lakh per semester (10 lakhs for the entire programme)
Additional Infrastructural requirements if any needed for the proposed programme	Additional block of 10,000 sq.ft required which can be built on self-financing basis by proposing a higher fee for the programme.

PG PROGRAMME-2

Name of the proposed Programme	Executive MBA
Nature of the programme proposed	Regular Post Graduate degree
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	18 months
Description of the programme proposed	As executives seek to adapt, and thrive in an era of rapid changes in technology and business models, continuous education and upskilling remains pertinent and in high demand. The proposed Executive MBA programme in hybrid mode is designed to cater to the potential demand among working executives for business degree without compromising on their current professional engagements. The program's standout feature is the chance to pursue regular MBA in a condensed timeframe during weekends, with the flexibility to opt for online learning for up to 30% of the total credit hours, thus enabling individuals to balance their executive education with their careers. **<u>Highlights of the course</u>** 1. The proposed programme will span FOUR semesters which include three semesters of 5 months each and the final semester of 3 months duration leading to the award of Master of Business Administration (MBA) 2. The programme is in hybrid mode (70% of programme delivery to be held on campus and 30% online). Students can choose the on-campus-online distribution of credit hours for each course in the programme subject to the maximum ceiling of 30% for online component per course 3. The programme meets the credit requirements of AICTE criteria for MBA curriculum. 4. On-campus classes will be held during weekends. No semester break/vacation is planned for the proposed Executive MBA programme.

	5. Extensive industry participation will be ensured for curriculum content development and delivery to align the programme with industry requirements.
Justification for launching the programme proposed	These programmes will provide a much-needed fillip to the university's efforts to establish itself as a centre of excellence providing high quality education in the public sector from possibly three different angles. (1) It strengthens the efforts of SMS to emerge as a national level B-School of repute by establishing a full-line business education mix of Two-Year MBA, Executive MBA, evening MBA, doctoral programme and an array of short-term skill development programmes in emerging business applications while adhering to our commitment to providing affordable education. (2) It offers us an opportunity to be the only B School in Kerala outside of IIM(K) to offer ExMBA which is potentially a big market if one can provide flexibility without compromising on academic rigour. (3) It can widen our revenue base and enhance the utilisation of faculty, staff and infrastructure resources. **Target Audience and USP of the programme** • Young and mid-level executives seeking to pursue MBA for career progression into managerial roles. • Early career professionals in Law/accounting • Entrepreneurs • With weekend classes and online component, students can balance their professional and academic commitments effectively. • Short duration of the programme combined with the flexibility of hybrid mode and the convenience of the weekend classes makes the

	programme attractive even for potential students from outside Kochi
Other institutes offering similar programmes	• IIM (K) - Two year MBA Programme (Kochi Campus -face to face) for working executives. • Evening batch & weekend batches • Programme fee - ₹12,00,000/-
Expected graduate outcomes of the proposed programme	After the completion of the programme, the particiapnats will : 1. Possess a thorough and interconnected comprehension of fundamental business disciplines. 2. Acquire the global outlook necessary to lead and oversee businesses within a diverse and dynamic setting. 3. Aemonstrate a robust understanding of, and capability to employ, evidence-based methodologies when making decisions. 4. Develop a strategic mindset and frameworks enabling them to identify and adeptly address both internal and external challenges and opportunities. 5. Be equipped with the frameworks essential for ethical and socially responsible management and leadership.
Partnership with Industry if any for the proposed programme	Partnerships with companies based in Kerala are possible in the areas of corporate sponsorships of candidates, curriculum development, launching tailored elective courses etc.
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme(Minimum 25)	30 seats
Proposed fees for the proposed programme	Rs. 75000 /semester for four semesters (Total cost of the programme: Rs. 3 Lakhs)
Additional Infrastructural requirements if any needed for the proposed programme	Since the classes are proposed to be held on weekend days, no additional classrooms are required. However, two existing

	classrooms can be furnished with s wFurnishing of an existing room with facilities like Smart board, furniture and 15 computers

POST GRADUATE DIPLOMA COURSE-1

Name of the proposed Programme	**Post Graduate Diploma in Banking and Insurance (PGDBI)**
Nature of the programme proposed	PG Diploma
Mode of delivery of the programme proposed	Hybrid Mode Contact sessions at regular intervals
Duration of the programme proposed	One Year
Description of the programme proposed	The primary objectives of the PGDCCD program are: 1. To give the young aspirants a 360-degree knowledge offering and to arm them with the tools they need to be future-ready as the whole Banking and Insurance sector beckons. 2. To impart a solid foundation in financial concepts, principles, and practices relevant to banking and insurance, including asset-liability management, financial markets, and investment strategies. 3. To develop participants' skills in financial analysis, enabling them to evaluate the financial health of banks and insurance companies, make informed investment decisions, and assess loan portfolios. 4. To develop participants' strategic thinking and decision-making skills, enabling them to formulate and execute effective business strategies in a competitive environment. 5. To instil ethical values and an understanding of legal issues in financial services, emphasizing the importance of ethical behavior and compliance with legal standards.

	6. To keep participants updated on the latest technological trends and innovations in the financial services industry, including fintech and insurance developments.
	7. To equip students with leadership and management skills essential for supervisory and executive roles in banks and insurance companies.
	8. To encourage entrepreneurial thinking and innovation in banking and insurance, preparing participants to identify and capitalize on emerging opportunities.
	9. To foster critical thinking and analytical skills through research projects and case studies relevant to banking and insurance.
	10.
	11. To introduce participants to the latest technological advancements and innovations in banking and insurance, including digital banking and insurance trends.
	12. Topromote networking opportunities with industry professionals, alumni, and peers, helping students build valuable connections in the financial services sector.
	Based on the objectives outlined for the Post Graduate Diploma in Banking and Insurance (PGDBI) program, the following are the learning outcomes expected for the participants:
	1. Demonstrate Banking and Insurance Knowledge:
	● Participants should have a comprehensive understanding of the banking and insurance industries, including key concepts, products, services, and regulatory frameworks.

	0. Financial Analysis:
	• Participants should be able to analyze financial statements, assess the financial health of banks and insurance companies, and make informed financial decisions.
	1. Risk Management:
	• Participants should understand various types of risks in banking and insurance, such as credit risk, market risk, and operational risk, and be capable of proposing risk management strategies.
	2. Customer Relationship Management:
	• Participants should be skilled in building and maintaining strong customer relationships, understanding customer needs, and delivering excellent customer service.
	• Adhere to confidentiality standards and demonstrate professionalism in handling sensitive information shared by clients.
	3. Technology Proficiency:
	• Students should be proficient in using technology and digital tools relevant to banking and insurance operations.
	4. Make Informed Financial Decisions:
	• Students should be able to make sound financial decisions, including investment choices and credit decisions.
	5. Understand Ethical and Legal Considerations:

	• Students should demonstrate ethical behaviour and have a grasp of the legal and ethical issues in the financial services industry.
	6. Lead and Collaborate:
	• Students should exhibit leadership skills and the ability to work effectively in teams in a banking and insurance context.
	7. Assess International Financial Practices:
	• Students should be able to compare and contrast banking and insurance practices in different countries and understand the implications of international finance.
	8. Promote Innovation:
	• Students should have an innovative mindset and be capable of identifying opportunities for innovation and improvement in banking and insurance operations.
	9. Participate in Industry Experiences:
	• Students should have practical exposure to the banking and insurance industry through internships, field visits, or industry collaborations.
	10. Prepare for Career Advancement:
	• Students should be well-prepared to pursue careers in banking and insurance, with developed job search and interview skills.
	0. Embrace Lifelong Learning:
	• Students should understand the importance of continuous learning and be motivated to stay updated with industry

	trends and developments
	The course outcomes of the PGDBI program are well-prepared to enter the workforce with the knowledge and skills necessary to excel in the banking and insurance sectors. These outcomes are designed to provide effective services to the society aligning with industry demands and changes in the financial service landscape.
Justification for launching the programme proposed	In India, the Banking and Insurance industry has long played a key role in significantly boosting the country's economy as a whole. The client is at the focus of the sector's current transition, which is being fuelled by digitization and the explosion of information. In order to provide a clear route for their professional advancement, banking and insurance professionals must exhibit strategic flexibility and continuous skill improvement. Additionally, a developing industry is anticipated to bring about a number of job prospects moving forward, and there is a real industry need to develop a pool of young people with the necessary skills who will have the cognitive vision to advance the business.

The PGDBI course in aligned in this juncture, where the professionals would be able to adapt the changing client expectations and technological advancements. Young professionals will be able to contribute to the growth and development of the banking and insurance sectors in the present competitive world by being given opportunities and support they need.

Eligibility for admission:

Any Degree

50% marks in Degree

Method of selection:

On the basis of Admission Tests and Interview |

	Distribution of seats: 30 seats
Other institutes offering similar programmes	Indian Institute of Banking and Finance in collaboration with National Institute of Securities Market and National Insurance Academy.
Expected graduate outcomes of the proposed programme	The graduate outcomes for a Banking and Insurance PG Diploma program can vary depending on the specific program, institution, and the goals of the students. However, here are some common outcomes that graduates of such a program can typically expect: - Graduates are often well-prepared for careers in the banking and insurance sectors. They may find employment with banks, insurance companies, brokerage firms, or other financial institutions in various roles such as banking analysts, insurance underwriters, financial advisors, risk analysts, or claims adjusters. - Graduates should have acquired a deep understanding of the banking and insurance industry, including financial products, risk management, investment strategies, and regulatory compliance. - Graduates are usually equipped with strong analytical skills, which are essential for assessing financial risks, managing portfolios, and making informed decisions in the banking and insurance sectors. Graduates often have a solid foundation in risk assessment and management, which is crucial in both banking and insurance, where managing financial and operational risks is a top priority. - Graduates should be aware of ethical considerations and regulatory requirements within the banking and insurance industries. Compliance with these regulations is essential for

	maintaining the integrity of financial markets.
Partnership with Industry if any for the proposed programme	Partnership with banking/non-banking financial institutions/insurance companies
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme(Minimum 25)	30
Proposed fees for the proposed programme	Rs. 20,000
Additional Infrastructural requirements if any needed for the proposed programme	Nil

POST GRADUATE DIPLOMA COURSE-2

Name of the proposed Programme	**Post Graduate Diploma in Career Guidance, Counselling and Development (PGDCCD)**
Nature of the programme proposed	PG Diploma
Mode of delivery of the programme proposed	Hybrid
Duration of the programme proposed	One Year
Description of the programme proposed	The primary objectives of the PGDCCD program are: 1. To equip participants with the essential skills and knowledge required for effective career guidance and counseling, including aptitude assessment, career planning, and decision-making techniques. 2. To create awareness among participants about the various career options available, emerging trends in the job market, and the skills demanded by different industries. 3. To train participants in providing personalized counseling to individuals, considering their unique interests, strengths, and aspirations. 4. To promote adherence to ethical principles in career guidance and

	counseling practices, ensuring confidentiality and professionalism.
	5. To encourage self-exploration among participants to understand their biases, values, and attitudes, which may impact their counseling approach.
	6. To enable participants to offer comprehensive support to individuals in career planning, goal setting, and skill development.
	7. To foster a commitment to ongoing professional development and staying updated with the latest trends in career guidance.
	Based on the objectives outlined for the Post Graduate Diploma in Career Guidance, Counselling, and Development (PGDCCD) program, the following are the learning outcomes expected for the participants:
	1. **Skill Development:** • Demonstrate proficiency in conducting aptitude assessments and career interest inventories for individuals seeking career guidance. • Apply various career planning and decision-making techniques to assist clients in identifying suitable career paths. • Develop effective communication and active listening skills to engage with clients empathetically and understand their career-related concerns.
	2. **Career Awareness:** • Analyse and stay updated with emerging trends in the job market, including new career options, skill

	requirements, and industry demands.
	• Provide comprehensive information about different career paths, helping clients understand potential opportunities and challenges associated with each option.
	3. **Personalized Guidance:**
	• Utilize a client-centred approach to understand the unique interests, strengths, and aspirations of individuals and tailor career guidance accordingly.
	• Design personalized career development plans for clients, considering their specific career goals and long-term aspirations.
	4. **Ethical Standards:**
	• Demonstrate a clear understanding of ethical principles and guidelines related to career guidance and counseling.
	• Adhere to confidentiality standards and demonstrate professionalism in handling sensitive information shared by clients.
	5. **Self-Exploration:**
	• Reflect on personal biases, values, and attitudes that may impact the counseling process and develop strategies to maintain objectivity and impartiality.
	•
	• Continuously engage in self-assessment and professional development to enhance counseling skills and knowledge.

	6. **Career Development Support:**
	● Assist clients in setting clear and achievable career goals based on their interests, skills, and market demands.
	● Provide guidance on skill development and training opportunities to help clients enhance their employability in their chosen career paths.
	7. **Continuous Improvement:**
	● Demonstrate a commitment to lifelong learning and stay updated with the latest trends, resources, and technologies relevant to career guidance and counseling.
	● Engage in reflective practice and seek feedback from peers and supervisors to improve counseling effectiveness.
	8. **Psychological Support:**
	● Recognize and respond to the emotional and psychological challenges clients may face during career decision-making and transitions.
	● Provide empathetic support and counseling techniques to help clients cope with career-related stress and anxiety.
	9. **Cultural Competence:**
	1. Exhibit cultural sensitivity and adapt counseling approaches to meet the diverse needs of clients from various cultural backgrounds.
	2. Promote inclusivity and diversity awareness in career guidance practices.
	10. **Entrepreneurship Support:**
	● Assist aspiring entrepreneurs in developing business plans, conducting market research, and evaluating the feasibility

	of their business ideas.
	• Provide guidance on accessing resources and support networks to facilitate entrepreneurial success. 11. **Technology Integration:** • Utilize technology tools and resources effectively in career counseling, such as online assessment platforms, job search portals, and virtual career fairs. • Help clients navigate digital platforms for networking and professional development. The learning outcomes of the PGDCCD program are designed to empower participants with the necessary knowledge, skills, and attitudes to provide competent and effective career guidance and counseling to individuals at various stages of their career journeys. These outcomes are aligned with the program's objectives, aiming to equip graduates with the expertise to support others in making informed career decisions, achieving their professional goals, and navigating the complexities of the modern job market.
Justification for launching the programme proposed	The need for career counseling in Kerala stems from the state's focus on education, the growing diversity of career options, the impact of technological advancements on the job market, the pressures of making informed career choices, increasing migration trends, the rise of entrepreneurship, and the socio-economic diversity within the state. Career counsellors play a crucial role in addressing these challenges by providing personalized guidance, information about emerging job trends, helping individuals align their skills with market demands, and supporting them in achieving their career

	aspirations. As Kerala continues to progress and adapt to the changing global scenario, career counseling will remain an indispensable resource in shaping a more fulfilled and prosperous workforce for the state.
	The Post Graduate Diploma in Career Guidance, Counselling, and Development (PGDCCD) program was designed to address this need for trained career guidance counsellors. It aims to equip individuals with the necessary knowledge, skills, and techniques to guide and counsel others in making well-informed career decisions.
	Eligibility for admission:
	Any Degree
	For the candidates who applied from open market must be secured 50% marks in Degree
	Method of selection:
	Reserved Seats: By nomination from National Employment Service Department (Kerala) and higher secondary department
	Open Seats: On the basis of Admission Tests and Interview
	Distribution of seats:
	10 seats reserved for the employees of National Employment Service Department (Kerala)
	5 seats for Higher Secondary School Teachers
	10 Seats for the candidates from open market.
	[*In case reserved seats are not filled, it may be allotted to candidates from open market]
Other institutes offering similar programmes	NCERT
Expected graduate outcomes of the proposed programme	What kind of career opportunities for participants if they successfully complete the course

Partnership with Industry if any for the proposed programme	National Employment Service Department (Kerala) and Higher Secondary Department
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme(Minimum 25)	25
Proposed fees for the proposed programme	Have to be fixed in consultation with National Employment Service, Kerala
Additional Infrastructural requirements if any needed for the proposed programme	Nil

2.29 DEPARTMENT OF SHIP TECHNOLOGY

UG PROGRAMME

Name of the proposed Programme	**B.Tech (Honours) in Naval Architecture & Ship Building**
Nature of the programme proposed	New degree / modification of existing
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	4 years
Description of the programme proposed	The existing course in the department B.Tech program in Naval Architecture and Ship Building has made significant contributions to the development of shipbuilding and industries within the country and around the world, with graduates working in the Indian Navy, DRDO, leading shipyards around the world, and industries related to shipbuilding and design. The Department is also actively involved in various research and industrial projects sponsored by government, research organizations and industry. Further, this department offers a M.Tech programme which is aligned to the analysis and design of structures in the marine and ocean environment. The ongoing research and development works include areas of marine hydrodynamics, marine structures, offshore technology, design of marine vehicles & systems, ship design and production.
	With this scenario of ongoing research in this field, the **newly proposed programme would include an additional 12 credits by learning advanced topics in the area of Naval Architecture, and also by taking up mini project/ research during the fifth to eight semesters.**
	The B.Tech Honours degree will enable students to equip themselves for more challenging R&D jobs and to contribute to innovative ship designs.
Justification for launching the programme proposed	Students scoring high ranks in the Common Admission Test (CAT) usually join for the B.Tech program in Naval Architecture and

	Ship Building. Therefore, they are capable of achieving higher standards and can be aligned to research and advanced courses in Ship Design, including focus on Finite Element Methods and Computational Fluid Dynamics, which are rapidly gaining popularity for naval architecture, ship building industry and ocean engineering applications. Which is the trend of the industry. The eligibility criteria are 10+2 or equivalent, along with their performance in CUSAT CAT examination.
Other institutes offering similar programmes	Engineering colleges under Kerala Technological University
Expected graduate outcomes of the proposed programme	The students of the B.Tech Honours programme will be able to do innovative research and projects and to increase the employability of undergraduate students in industries and R& D organizations.
Partnership with Industry if any for the proposed programme	Shipyards in India (like, Cochin Shipyard Limited), R& D labs (NSTL, NPOL), and other industries in this domain.
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	Students with CGPA > 8.0 only eligible to opt for the Honours Programme. The intake for the existing B.Tech programme in Naval Architecture and Ship Building is 40.
Proposed fees for the proposed programme	Rs. 1500/- for each additional credit-course during the B.Tech (Hons.) programme
Additional Infrastructural requirements if any needed for the proposed programme	Infrastructure facility for the PG programme can be extended. However, in the long run, additional workstations need to be added for research purpose.

CERTIFICATE COURSE-1

Name of the proposed Programme	**APPLIED FINITE ELEMENT METHODS**
Nature of the programme proposed	Certification
Mode of delivery of the programme	Online

proposed	
Duration of the programme proposed	20 hours
Description of the programme proposed	Here in this course Applied Finite Element Method (FEM), detailed applications will be solved while analysing real life examples.
Justification for launching the programme proposed	The programme will be best suited for • Young professionals and university graduates and postgraduates interested in knowing the practical applications of FEM • The candidates interested to know and learn the different commercial packages available on FEM
Other institutes offering similar programmes	Online courses in Coursera and MOOC
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of fresh graduates. It will give additional competencies to working professionals
Partnership with Industry if any for the proposed programme	NPOL
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme(Minimum 25)	25
Proposed fees for the proposed programme	Rs 5000 (Five thousand only)
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERTIFICATE COURSE-2

Name of the proposed Programme	**Introduction to Computational Fluid Dynamics Simulations using OpenFOAM**
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online or Offline or Hybrid
Duration of the programme proposed	20 hours
Description of the	Computational Fluid Dynamics.

programme proposed	Computational Fluid Dynamics (CFD) simulations have an inevitable role in the domain of Ocean Engineering, Mechanical Engineering and Civil Engineering. Before constructing an infrastructure project or manufacturing a prototype of a product, it is essential to study the various life-cycle environments or events they will be subjected to. CFD is one such method in the applicable area. This approach of numerical simulations in the area of fluid flow, heat transfer and other associated fields is helping solve associated challenges and optimise the designs. Some of the applications include, 1. Hydrodynamic simulations 2. Ocean wave simulations 3. Fluid-Structure Interaction 4. Aerodynamic simulations 5. Jet propulsion 6. Heat transfer 7. Effluent discharge Numerical simulations and experimental studies verify and validate the computational models engaged in the various associated fields. This programme focuses on a hands-on introduction to OpenFOAM, the open-source CFD package. Case setup, post-processing and validation approaches will be covered in various sessions.
Justification for launching the programme proposed	Due to the advent of cost-effective computation and rising popularity in open-source software packages, Computational Fluid Dynamics simulations in OpenFOAM are gaining traction. Many industrial, professional, and research organisations in global and local markets are looking for skilled CFD analysts for their simulation needs. And so, the growth and opportunities, in both the present and the future, global and local scenarios are best without a doubt. **Industries Involved** Computational Fluid Dynamics Simulations are gaining traction recently in a lot of industries. Thanks to the efficient computing and algorithm working behind. Some of the sectors actively involved include, 1. Shipbuilding 2. Automobile 3. Aeronautics 4. Offshore, Sub-sea and Ocean Engineering 5. Sustainable energy research – Wind and Ocean Wave Energy Harvesting

	6. Electrical and Electronics and so on.
Other institutes offering similar programmes	Udemy, RKS Technologies
Expected graduate outcomes of the proposed programme	Upon successfully completing the programme, the candidate would be capable of setting up a CFD simulation case in OpenFOAM and other similar packages. The verification and validation of the results and the approaches regarding this process will also be covered, and candidates will be capable of performing the same.
Partnership with Industry, if any, for the proposed programme	NIL
Partnership with foreign universities, if any, for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	15 (subjected to availability of computational facilities with the candidates)
Proposed fees for the proposed programme	Rs 10,000/-
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERTIFICATE COURSE-3

Name of the proposed Programme	Corrosion and its control in industries
Nature of the programme proposed	certification
Mode of delivery of the programme proposed	Offline/online
Duration of the programme proposed	One month
Description of the programme proposed	This corrosion course aims to provide the participants with a thorough understanding of the causes of corrosion in the industries and the technical know-how of corrosion prevention. Upon completion of the course

	the
	participants will be able to identify different forms of corrosion, analyze the root causes of common corrosion failures, select appropriate materials for applications in the industries, specify and apply proper protection methods against corrosion. This corrosion short course can be taken as in-house training course, online course and distance learning course worldwide. It can also be customized to meet the specific needs of organization/industries.
Justification for launching the programme proposed	Basic degree in science and engineering and industry sponsored candidates
Other institutes offering similar programmes	Nil
Expected graduate outcomes of the proposed programme	After completing the course , they can work as corrosion engineer and corrosion inspector
Partnership with Industry if any for the proposed programme	With CECRI Karaikudi
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme(Minimum 25)	30
Proposed fees for the proposed programme	Rs 20,000/- per participant
Additional Infrastructural requirements if any needed for the proposed programme	No

MOOC COURSE-1

Name of the proposed Programme	Computational Methods in Engineering
Nature of the programme proposed	MOOC
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	One Semester
Description of the programme proposed	Computational Methods in Engineering is a multi disciplinary global elective being offered in institutions of eminence. The core disciplines like mathematics, computer science and computer programming are basis of this course. The course is basically an application of numerical methods of mathematics to practical

	engineering problems coming under mechanical, civil and electrical engineering. The application of numerical differentiation, numerical integration, root finding, solution of system of algebraic equations, finite difference method of solution of partial differential equations, numerical solution of ordinary differential equations etc. pertinent to practical engineering problems will be dealt in the course. The problem-solving using programming languages and software packages etc. also will be introduced in the course. The students will get exposure to solve engineering problems using computers.
Justification for launching the programme proposed	As most of the engineering problems need computer-based solutions, this is the basis of such approach. All engineering students need to have a strong basis of computational methods that can be employed.
Other institutes offering similar programmes	NPTEL
Expected graduate outcomes of the proposed programme	Placement opportunities will be higher as the students have strong foundations of computational methods in engineering.
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme(Minimum 25)	25
Proposed fees for the proposed programme	Rs 1000 per candidate
Additional Infrastructural requirements if any needed for the proposed programme	Nil

MOOC COURSE-2

Name of the proposed Programme	**Universal Human Values in Professional Courses**
Nature of the programme proposed	MOOC
Mode of delivery of the programme proposed	Hybrid

Duration of the programme proposed	4 weeks
Description of the programme proposed	A brief note on the content of the programme (Max 500 words) Universal human values (UHV) was introduced by AICTE in 2018 to all professional courses in INDIA. The need of UHV to teach this subject to undergraduate students needs more clarity nowadays by detailing the relationship between the skill education (B.Tech, Poly Technic etc.) and value education (UHV). This requires watching and learning from different videos on value education and corelating it with skill education. Here in the proposed MOOC course the activity based on videos and the group discussions involving the importance of values in life will be covered. Difference between proposals and natural acceptance will be detailed in this Course. Other topics covered include the difference between form and essence, sympathy and empathy & transactions and relationship. A detailed discussion on professional ethics will be covered in this class.
Justification for launching the programme proposed	A note of the market viability. Mention admission criteria, target audience etc to show sufficient demand. Since UHV is an extremely important topic since the students in general seems to have less trust and respect to others, this course needs to be known well to both teachers and students. Importance of happiness over financial benefits in life needs to be known well to students and importance of responding in a situation rather than reaction will be covered in this Course.
Other institutes offering similar programmes	AICTE is offering online courses in UHV only.
Expected graduate outcomes of the proposed programme	What kind of career opportunities for participants if they successfully complete the course After completing this course students are expected to improve their emotional quotient and can become team leaders in their professional life. They can understand the difference between ethics and values in life.
Partnership with Industry if any for the proposed programme	Not necessary
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the	30

proposed programme (Minimum 25)	
Proposed fees for the proposed programme	1000 (Thousand rupees only)
Additional Infrastructural requirements if any needed for the proposed programme	Please keep it to the bare minimum

A record studio with the facility for the offline participants to attend this course directly while the classes is being recorded. |

2.30 DEPARTMENT OF STATISTICS

PG PROGRAMME-1

Name of the proposed Programme	Integrated M.Sc in Statistics (2024 admission onwards)
Nature of the programme proposed	Integrated B.Sc and M.Sc
Mode of delivery of the programme proposed	Offline, Regular
Duration of the programme proposed	5 years
Description of the programme proposed	The Integrated M.Sc. in Statistics programme aims to facilitate the students who have completed their higher secondary education to learn, practice and make a career in the field of statistics. The curriculum of the program equips the students to nurture a blend of theoretical and practical applications of statistics. The program also trains students in using modern statistical software like IBM SPSS, R, and Python for data analysis across various disciplines, enabling placements in data analytics companies. Semester-wise academic planning, specially invited lectures by eminent scholars from national/international institutions, campus recruitments, and a choice-based credit system are program highlights.
Justification for launching the programme proposed	The proposed programme is aimed at giving a quality education in the field of statistics and preparing students for their careers in research and academic fields, and employability in industry. As there is a growing demand for trained and skilled people in the field of statistics, we strongly feel that employability opportunities for the students of this programme are very bright. We are also aiming at training students admitted to this programme so that they can easily pursue their higher studies in primer institutes in India and abroad. A successfully completed student of this programme is expected to be employed in a broad range of companies (including R & D sectors of financial, pharmaceutical, market research), software development companies, consultancy, analytic, scientific, government, health, teaching etc.
Other institutes offering similar programmes	Pondicherry University, Central University of Rajasthan
Expected graduate outcomes of the proposed programme	• Students will be trained to apply data skills to solve real-world problems across diverse domains, including business, manufacturing, banking, genome analysis, and business analytics. • Students will be able to develop abstract thinking and design proficiency to comprehend data science

	concepts rooted in mathematics, statistics, computer science, and related fields.
	• Students will be able to address domain-specific challenges aligned with global trends. They will be able to apply research-based knowledge to experiment design, data analysis, interpretation, and synthesis to reach valid conclusions.
Partnership with Industry if any for the proposed programme	IQVIA
Partnership with foreign universities if any for the proposed programme	Rutgers University, USA (in the process)
Number of seats in the proposed programme (Minimum 25)	15 (As part of other integrated M.Sc programmes in Science)
Proposed fees for the proposed programme	Same as other Integrated M.Sc programmes in Science of the University
Additional Infrastructural requirements if any needed for the proposed programme	Classrooms: 400 sq ft ×3 Faculty positions: Assistant Professors - 3

PG PROGRAMME-2

Name of the proposed Programme	M.Sc. Actuarial Science (2025 admission)
Nature of the programme proposed	Evening Post Graduate Degree
Mode of delivery of the programme proposed	Offline/Hybrid
Duration of the programme proposed	2 years
Description of the programme proposed	The proposed Master's level program in Actuarial Science will train the students to assess the financial impact of risk and uncertainty in the fields of Insurance, Finance, and other Industries. The graduates of this program will be able to clear the requirements to become members of the Institute of Actuaries of India as well as the International Institutes of Actuaries. Earlier the role of Actuaries was limited to life insurance and pension-related planning. But nowadays actuaries play an active role in a variety of sectors such as designing and pricing policies in life and general insurance, monitoring and valuation of the insurance business, they also define the risk factors, advising on the premia to be charged and re-insurance to be purchased, calculate reserve for outstanding claims and carry out financial modeling and so on. An actuary can

	work as a consultant either individually or in partnership with other Actuaries in multi-disciplines like insurance, information technology, taxation, employees' benefits, risk management, investment, etc. The scope of the functions and duties of an Actuary has increased considerably under the changed conditions all over.
	As businesses and governments globally stepped up to adapt to a dynamically changing world, due to pandemics and other natural calamities, Actuarial Science began evolving to assume the new roles it now needs to play, as old functions became insufficient. More organizations have begun to rely on the skills of actuaries and analysts to model and plan for the future. However, it did not take much momentum in India till recently. A career in this field requires the use of Maths, Statistical knowledge, risk assessment skills, and evaluation of financial products such as insurance and investments.
	Objectives and learning outcomes The course study involves the application of Mathematics and Statistical methods that are related to business management and insurance problems. The course study involves instructing students on quantitative and non-quantitative analysis such as *risk management, forecasting theory, expansion of risk tables, computer-assisted research, secondary data analysis, and economic risks* in the business sector as well as the insurance field. The practicalities of making informed decisions for businesses and individuals and an understanding of risk management will also be provided. Actuarial science is a relatively new career, keeping in mind the age-old clichés that are present. A person who studies the course can now be a part of the banking and business field. The fact is that actuaries are amongst the ***highest-paid individuals*** today. A fresher from the industry can be paid as much as Rs. 10,00,000 per annum. The job is highly rewarding in any part of the world and is in demand due to ample vacancies as it is a skilled job that requires a qualified person to solve risk-involved problems.
Justification for launching the programme proposed	As far as the state of Kerala is concerned, an Actuary can play a significant role even in the predictions related to family pensions due to high life expectancy. Insurance companies and Government organizations need to be prepared to meet the eventualities resulting

	from the frequent floods and pandemics such as COVID-19 in the state. The knowledge and experience of an Actuary can be useful for predicting the future requirements of the state machinery and finance resources to face the consequences of any natural disasters. They can also advise the Banks and Insurance companies to be prepared. Eligibility Criteria To be eligible for M.Sc. Actuarial Science, candidates must have a bachelor's degree in Mathematics and Statistics. They must also have a minimum aggregate score of 50% in their undergraduate degree.
Other institutes offering similar programmes	University of Kerala, MG University
Expected graduate outcomes of the proposed programme	On successful completion of the program, the students will attain the following: 1. A detailed understanding of economic, financial, demographic and insurance risks. 2. Expertise in developing and using statistical and financial models to make suitable decisions. 3. Acquire skills to determine the present effects of future contingent events or in finance modelling and risk analysis in relevant areas of interest. 4. Able to apply professional rigour combined with a commercial approach to the decision-making process. 5. Become business professionals who deal with the financial impact of risk and uncertainty. 6. Qualify to work in private or public sectors such as Life insurance, Health care insurance, Pensions, Financial Institutions, Investments, Enterprise risk management, Academics, Regulatory, etc.
Partnership with Industry if any for the proposed programme	Institute of Actuaries of India and International Institutes of Actuaries
Partnership with foreign universities if any for the proposed programme	Nil
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Similar to M.Tech fees
Additional Faculty and Infrastructural requirements	**Faculty and staff requirements:**

	1. Associate Professor – 1
if any needed for the proposed programme	2. Assistant Professors – 3
	3. Technical Staff – 1.
	Logistics requirement:
	1. Two classrooms to accommodate 25 students each
	2. Office rooms for 4 faculty and a technical staff
	3. A computer lab with 25 desktop computers and internet facilities

CERTIFICATION COURSE

Name of the proposed Programme	Applied Statistics for Data Science
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	30 hours
Description of the programme proposed	The training programme titled Applied Statistics for Data Science is a comprehensive course on tools and techniques to handle data. Takers of this course will learn to develop skills in handling statistical tools and techniques using R.
	The objectives of the programme include
	1. To gain an understanding of statistical concepts and their practical implementation on data from various domains.
	2. Understand the difference between description and inferential statistics, using covariate information.
	3. Implement estimation of the unknown in modelling.
	4. Set up and test suitable hypotheses.
	5. Decision making and interpretation.
	6. Learn about data analytics methods.
Justification for launching the programme proposed	Data Science enables companies to efficiently understand data from multiple sources and derive valuable insights to make smarter data-driven decisions. Equipping these skills enhances the employability of a candidate.
	The programme will be best suited for

	• Students and young professionals interested in research or career in data science • Anyone who wants to develop or enhance their knowledge and skills in data driven conclusions in their domain field.
Other institutes offering similar programmes	IIT Kanpur, IIM Kozhikode, Online courses in Coursera, Great Learning, edX and Udemy
Expected graduate outcomes of the proposed programme	Acquire a fundamental understanding of the analytical techniques and software tools necessary to effectively generate useful information from datasets. It will give additional competencies to working professionals in Industries.
Partnership with Industry if any for the proposed programme	Nil
Partnership with foreign universities if any for the proposed programme	No
Number of seats in the proposed programme (Minimum 25)	As per enrolment
Proposed fees for the proposed programme	As per University rules
Additional Infrastructural requirements if any needed for the proposed programme	Nil

2.31 CENTRE FOR BUDGET STUDIES

PG PROGRAMME

Name of the proposed Programme	MSc. Economics (5 Year integrated)
Nature of the programme proposed	Regular Post Graduate degree (5 Year integrated)
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	5 years with multiple exit options
Description of the programme proposed	

Highlights:

The MSc. 5-Year Integrated Programme in Economics is a comprehensive and innovative academic journey designed to equip students with a deep understanding of economic principles, analytical skills, and real-world applications. This program seamlessly integrates undergraduate and postgraduate studies, offering a unique and immersive educational experience. Here are some key highlights:

Seamless Integration: This program combines undergraduate and postgraduate studies, saving student's time and providing a continuous and cohesive learning experience.

Strong Foundation: Beginning with fundamental courses in economics, mathematics, and statistics, students build a strong foundation in economic theory and quantitative analysis.

Interdisciplinary Approach: The program encourages interdisciplinary learning, allowing students to explore the intersection of economics with fields like finance, politics, sociology, and environmental studies.

Research Focus: From the early years, students are encouraged to engage in research activities, enabling them to develop critical thinking, problem-solving, and research skills.

Expert Faculty: Our renowned faculty members are experts in various domains of economics and provide mentorship to students, guiding them towards academic excellence and research success.

Real-world Applications: The curriculum includes practical case studies and projects that bridge the gap between theory and practice, preparing students for careers in academia, government, NGOs, and the private sector.

Global Perspective: Students gain a global perspective on economic issues through international collaborations, exchange programs, and exposure to diverse economic systems and policies.

Economic Policy Analysis: The program equips students with the tools and knowledge to critically evaluate economic policies and contribute to informed decision-making.

Internship Opportunities: Students have access to internships with leading economic research institutions, government bodies, and corporations, enhancing their practical experience and employability.

Networking Opportunities: Through seminars, workshops, and conferences, students build a network of industry professionals and fellow scholars, opening doors to future career prospects.

Pathways to Further Studies: Graduates have the option to pursue doctoral programs or transition into careers in academia, research, public policy, finance, consulting, and more.

Holistic Development: The program emphasizes holistic development, fostering leadership skills, ethical values, and social responsibility in addition to academic excellence.

The MSc. 5-Year Integrated Programme in Economics is a transformative educational journey that not only equips students with a deep understanding of economics but also prepares them to make a meaningful impact on society and the global economy. It is an investment in both academic and personal growth, paving the way for a successful and fulfilling future.

Justification for launching the programme proposed

Meeting Market Demand: There is a growing demand for economists and economic analysts in various sectors, including government, finance, international organizations, and research institutions. Launching this program aligns with the need for highly skilled professionals who can navigate complex economic challenges.

Streamlined Education: The integration of undergraduate and postgraduate studies streamlines the education process, making it more efficient for students while maintaining high academic standards. This appeals to students seeking a faster, yet rigorous, educational path.

Interdisciplinary Learning: An interdisciplinary approach equips students with a broader skill set, allowing them to tackle complex problems from multiple angles. This aligns with the changing demands of the job market, where professionals are often required to work across disciplines.

Research Opportunities: Early exposure to research activities fosters a culture of inquiry and innovation among students. It not only prepares them for academic careers but also provides research skills that are valuable in industries where data-driven decision-making is crucial.

Global Perspective: In an increasingly interconnected world, understanding global economics is paramount. This program offers international exposure and prepares students to participate in discussions on global economic issues.

Economic Policy Expertise: Trained economists are essential for informed policymaking. Graduates from this program will be equipped to contribute to evidence-based policy formulation at local, national, and international levels.

Employability: The program's practical orientation, internships, and networking

opportunities enhance students' employability. They graduate with not only academic knowledge but also real-world experience.

Promoting Higher Education: By offering a seamless transition to postgraduate studies, this program encourages more students to pursue advanced degrees. This contributes to the growth of higher education and research in economics.

Alignment with Institutional Goals: Launching this program aligns with the institution's goals of offering innovative and relevant academic programs that meet the needs of today's students and the job market.

Competitive Advantage: In a competitive educational landscape, offering a unique and integrated program can help attract high-caliber students and faculty, enhancing the institution's reputation.

Economic Development: By producing highly skilled economists, the program indirectly contributes to economic development by providing talent for industries and government agencies involved in economic planning and development.

Library and Study Spaces: A well-equipped library and dedicated study spaces are fundamental for academic success. Students need access to a wide range of academic materials and quiet spaces for focused study and research.

Long-Term Impact: This program not only addresses immediate market demands but also contributes to the long-term development of a highly skilled workforce, benefitting society and the economy for years to come.

Launching the MSc. 5-Year Integrated Programme in Economics is not only justified but also strategically advantageous for the institution, students, and society at large. It addresses the growing need for skilled economists, fosters interdisciplinary learning, promotes research, and prepares students for a range of careers in an ever-evolving global economy.

Other institutes offering similar programmes	IITs, Central Universities

Expected graduate outcomes of the proposed programme

Deep Understanding of Economics: Graduates will possess a comprehensive and advanced understanding of economic theories, principles, and concepts, enabling them to analyze and address complex economic issues.

Analytical Skills: Graduates will be equipped with strong analytical and quantitative skills, allowing them to dissect data, model economic scenarios, and make data-driven decisions in various contexts.

Research Proficiency: Graduates will have the ability to conduct rigorous economic research, including data collection, analysis, and interpretation, contributing to advancements in the field.

Policy Expertise: Graduates will be well-versed in economic policy analysis, capable of assessing the impact of policies and providing recommendations for evidence-based decision-making.

Interdisciplinary Knowledge: The program's interdisciplinary approach will enable graduates to apply economic principles to diverse fields such as finance, politics, sociology, and environmental studies, making them versatile professionals.

Global Perspective: Graduates will have a global outlook, understanding international

economic dynamics, trade, and global financial systems, making them valuable assets in the globalized job market.

Effective Communication: Graduates will be proficient in conveying complex economic ideas and analyses to diverse audiences, including policymakers, business leaders, and the public.

Problem-Solving Skills: Graduates will be adept at identifying economic challenges and proposing innovative solutions, whether in the public or private sector.

Ethical Values: The program will instill ethical values in graduates, emphasizing the importance of responsible and ethical decision-making in economic matters.

Professional Network: Graduates will have a well-established professional network, thanks to interactions with faculty, fellow students, and industry professionals during their academic journey.

Employability: Graduates will be highly employable in a range of careers, including but not limited to economic research, policy analysis, financial services, consulting, academia, and government.

Lifelong Learning: The program's emphasis on research and critical thinking will cultivate a passion for lifelong learning and adaptation to evolving economic trends and technologies.

Leadership Potential: Graduates will be well-prepared for leadership roles, capable of guiding organizations and making informed decisions that have a significant impact on society and the economy.

Contribution to Society: Graduates will contribute to society by participating in evidence-based policymaking, conducting research that informs economic development, and promoting economic literacy and understanding among the general public.

Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	The total number of seats will be capped at 40.
Proposed fees for the proposed programme	Rs. 25000 /semester for four semesters (Total cost of the programme: Rs. 2.5 Lakhs)
Additional Infrastructural requirements if any needed for the proposed programme	3 Classrooms

CERTIFICATION COURSE

Name of the proposed Programme	Certificate Program in Advanced Econometrics

Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	30 hours
Description of the programme proposed	The Certificate Program in Advanced Econometrics is designed to provide participants with a comprehensive understanding of advanced econometric techniques and their applications in economics and related fields. The Certificate Program in Advanced Econometrics is a rigorous and specialized educational offering designed to equip participants with advanced knowledge and practical skills in the field of econometrics. This program is ideal for individuals seeking to enhance their expertise in econometric methods and statistical analysis, making it suitable for professionals, researchers, and students aspiring to excel in economics, finance, public policy, and related fields. The program aims to achieve the following objectives: ☐ **Advanced Analytical Skills:** Equip participants with advanced quantitative and statistical skills necessary for conducting rigorous empirical research in economics and related disciplines. ☐ **Model Building and Testing:** Train participants in the development and assessment of econometric models for analyzing complex economic phenomena. ☐ **Policy Analysis:** Enable participants to apply econometric methods to evaluate economic policies and make data-driven recommendations. ☐ **Research Proficiency:** Enhance participants' ability to critically evaluate existing research and contribute to the field through their own econometric analyses. ☐ **Software Proficiency:** Familiarize participants with widely used econometric software tools such as R, GRETL and E Views for data analysis.
Justification for launching the programme proposed	The Certificate Program in Advanced Econometrics addresses a growing need in the academic and professional world. The justification for launching this program is as follows: **Market Demand:** In an increasingly data-driven world, there is a high demand for professionals with advanced econometric skills. Employers across various sectors seek individuals who can analyze and interpret complex

economic data effectively.

Research Opportunities: The program caters to individuals looking to engage in advanced economic research. Econometric techniques are essential for conducting robust empirical studies, making this program invaluable for aspiring researchers.

Skill Gap: There is a noticeable gap in the availability of programs that focus specifically on advanced econometrics. This program aims to fill that gap by providing specialized training in this critical field.

Practical Application: Advanced econometric skills are applicable in various domains, including finance, public policy, healthcare, and more. The program equips participants to tackle real-world economic problems and contribute to evidence-based decision-making.

Other institutes offering similar programmes	IIT Delhi, IIM Indore, Online courses in Coursera and Udemy
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of fresh graduates in industries like software, electronics, and construction. It will give additional competencies to working professionals
Partnership with Industry if any for the proposed programme	Project Management Institute (PMI)
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme(Minimum 25)	30
Proposed fees for the proposed programme	Rs 5000
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.32 PROF. N R MADHAVA MENON INTERDISCIPLINARY CENTRE FOR RESEARCH ETHICS & PROTOCOLS (ICREP)

UG PROGRAMME

Name of the proposed Programme	Five Year Integrated Degree Programme B.Sc LL.B (Computer Science)
Nature of the programme proposed	New Under Graduate Degree (A Joint Degree programme with Kerala University of Digital Sciences)
Mode of delivery of the programme proposed	Offline
Duration of the programme proposed	Five Years
Description of the programme proposed	The Five -Year Integrated Degree Program, B. Sc LL.B (Computer Science) aims at providing an integrated view on law and computer science. It consists of 10 semesters and covers comprehensively areas of law such as Constitutional Law, Criminal Law, Administrative Law, Corporate law etc., but on the other hand gives basic insights on operating systems concepts, system programming, cybersecurity etc. The E-Courts system has become a reality today. Digitalisation of records, virtual courts, e-filing etc. has become much common. The legal education has to tune it self to the growing demand of lawyers and professionals with a knowledge on computer science. This course caters to the current demand in the area of legal services.
Justification for launching the programme proposed	Most of the Universities and Law Colleges (Both Public and Private) are only offering integrated courses such as B. Com LLB (5 year), BA LL. B or BB. A LL.B (5 year) or 3-year degree course. If this Course is introduced the rush of students seeking admission too ther institutions can be utilised. Similarly,

	those students who had taken science in their plus two will be attracted towards seeking admission for the course. CRITERIA FOR ADMISSION: 1. Candidate must have passed the Plus Two in Science Stream or Commerce/Arts Stream with Mathematics or Statistics subject with 50% marks or equivalent. (Relaxation for percentage of marks permissible for reserved category as per University/Government norms) 2. Candidate should have passed the Common Admission Test conducted by CUSAT with the required qualifying score. 3. Targeted Audience: All those who have passed plus with interest in the field of law and computer science can be attracted.
Other institutes offering similar programmes	National Forensic Science University, Gujarat NLIU, Bhopal
Expected graduate outcomes of the proposed programme	We live in technology driven world. The Digital technologies have become all pervasive. It has made great inroads into administration of justice as well. Today a lawyer or a judge or legal researcher or a legal academician needs to know not only the law but also the digital technologies since the court proceedings today is digitalised as there is digitalisation of court records, judgments, digital evidence etc. Hence it is inevitable that law graduates need to have basic awareness of digital sciences.
Partnership with Industry if any for the proposed programme	NA
Partnership with foreign universities if any for the proposed programme	No foreign University. Instead, this program is proposed to be conducted jointly with Kerala University of Digital Sciences, KERALA
Number of seats in the proposed	25

programme (Minimum 25)	
Proposed fees for the proposed programme	Rs.30000/- per semester (Tuition fee & Special fee)
Additional Infrastructural requirements if any needed for the proposed programme	2 Additional Floors having class rooms, Moot Court Hall, Computer Labs needed

CERTIFICATE COURSE-1

Name of the proposed Programme	Animal Protection Laws and Animal Ethics
Nature of the programme proposed	Certificate programme
Mode of delivery of the programme proposed	Online/ Hybrid
Duration of the programme proposed	30 hours
Description of the programme proposed	The online certificate programme titled, Animal Protection Laws and Animal ethics" is intended to provide an insight as to the inter connectedness of human life with all beings around him and obligation to respect the same. In order to build a more equitable world for all, we must examine how the legal system impacts welfare as a whole. Animal law is an imperative area of learning for all individuals particularly those in the legal field (be it the lawyer or judge), the scientists who use laboratory animals, faculty, researchers, the veterinarians, agriculturalist, Policy makers apart from the animal rights activists. It introduces the participants to the broad range of laws that deals with companion animals, farm animals, animals used for scientific experimentation. It discusses the Philosophical basis of animal ethics and there by tries to resolve contemporary issues of human-animal conflicts which is useful for policy makers as well. Objectives of the programme: ● Understand the interconnectedness human life and other forms of life. ● Identify major areas of conflict between human

	and animal life.
	● Discuss the role of animal ethics in resolving the human-animal conflicts.
	● Learn the fundamental legal frame work which recognizes and protects animal rights.
	● Develop critical analytical skills for resolving human-animal conflicts.
Justification for launching the programme proposed	This program would enable the participants to appreciate the legal debates on relationship between man and animal. It will enable the participants to understand the cultural, economic and legal context of animal use and exploitation. There are several protocols with regard to use of animals in laboratories which are hardly known to scientists, researchers, academicians. The program would throw light on all these aspects. Moreover, the absence of knowledge of animal ethics in common parlance had given rise to lot of legal, social and ethical issues and hence the program intends to disseminate knowledge on animal ethics and the legal regime in this area. The programme will be best suited for ● All those in the legal field including lawyers, judges, academicians and students. ● All those engaged in academics and research in the field of life sciences. ● Any one engaged as animal rights activists or NGO's.
Other institutes offering similar programmes	NALSAR,MNLU, NLU-Odisha
Expected graduate outcomes of the proposed programme	It will boost the career opportunities in the field of legal practice, in scientific research institutions, in academics as well
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	30

Proposed fees for the proposed programme	Rs 5000/- Students-Rs2000/-
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERTIFICATE COURSE-2

Name of the proposed Programme	Cyber Security,Cyber Ethics and Data Protection Laws
Nature of the programme proposed	Certificate Program
Mode of delivery of the programme proposed	Online
Duration of the programme proposed	30 hours
Description of the programme proposed	This program is intended to give a basic awareness to all those who use internet and digital tools in their day today lives about the need for ensuring not only their safety and security but also all other fellow users. This basic level program focusses on three major dimensions, technology/tools essential for cybersecurity, ensuring cyber ethics in cyber world and basic awareness of data protection laws of the country. The program is for all categories of individuals and it gives insights as to how to use basic tools and technologies to protect their devices and also the basic ethical parameters one needs to adhere to. Since cyber crimes are multiplying day by day and data breach/violation being a common phenomenon, the program envisages the idea of educating the participants on data protection laws. *Objectives of the Program:* ● Identify the major challenges in the cyber world ● Understand the major tools available for ensuring cyber security and safety ● Gain deeper insights on cyberethics. ● Examine the different data protection laws and ethical guidelines in this area.

Justification for launching the programme proposed	Use of the cyber space is a reality today. However, there is dearth of knowledge on the safe use of the cyber space. Therefore, this particular program aims at educating all those who use the cyber world to use the same skilfully, smartly and safely. Also, to make them aware of the necessity for conduct of ethical conduct and adherence to data protection laws. The programme will be best suited for ☐ Any person who has passed plus two with not less than 55% marks. (Both employed or unemployed may apply) ☐ Graduate and Post-graduate students pursuing their UG/PG program in any college/universities. ☐ Students pursuing LL.B course/ B.Tech Courses may also apply.
Other institutes offering similar programmes	IIT Kanpur, NIIT, Online courses in Coursera and Udemy. (In all these programs both there are Mid-level and Advanced program)
Expected graduate outcomes of the proposed programme	The program would enhance the ability of its participants to the safe use of digital tools and technologies. It would also educate them on the remedies available against violation of their rights in the cyber space.
Partnership with Industry if any for the proposed programme	Kerala Police Academy,Thrissur
Partnership with foreign universities if any for the proposed programme	
Number of seats in the proposed programme (Minimum 25)	45 seats
Proposed fees for the proposed programme	Rs 5000/- Students– 2000/-
Additional Infrastructural requirements if any needed for the proposed programme	NIL

CERTIFICATE COURSE-3

Name of the proposed Programme	GIS and Remote Sensing Laws and Ethics
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	Online/Hybrid

Duration of the programme proposed	30 hours
Description of the programme proposed	The certificate programme titled, 'GIS and Remote Sensing Laws and Ethics" is a specialized programme. A Geographic information system or GIS is a computer system for capturing, storing, checking, and displaying Data related to positions on Earth's surface. It is a computer-based system used to capture, store, analyze, and display geographic information, while remote sensing entails obtaining information about the Earth's Surface by examining data acquired by a device, which is at a distance from the surface of the earth. Special Cameras collect remotely sensed images, which help researchers "sense" things about the Earth. These Technologies are used in many contexts such as for mapping, meteorology, urban planning, military/ intelligence purpose, environment purpose, disaster management, ocean topography, aviation, Shipping etc. There are many legal and policy issues relating to the sharing of geographic information, the data generated by mobile devices, the intellectual property issues, security and privacy issues, business and contractual issues related to GIS, and the standards of care and liability related to GIS. This course focuses on the evolving laws, policies, and institutions that have long-term ramifications for remote sensing and the ethical debates which it has ignited. The objectives of the programme include ● To introduce the law and policy both at the national and international level relating to remote sensing. ● Discuss on the relevance of these technologies ● Identify the issues and challenges posed by GIS and remote sensing. ● Understand the significance of regulations on GIS and remote sensing and its impact on regional and international discourses ● To evaluate the ethical and legal discourses in this are a and suggest possible changes in the existing Regulatory frameworks

Justification for launching the programme proposed	This is a specialised program and of a unique nature as it touches upon the interface of the GIS and Remote Sensing Technology with law and policy. It also throw slight on ethical concerns. It is useful not only for those in the field of law but also for those who are geospatial practitioners i.e., those who work with diverse technologies, mapping or cloud services, applications, multiple data types and sources. They work in government departments, private sector, non-profits. Those who work in the aviation, space industry, shipping etc. also need to know about the national and international framework and guiding ethical principles in this domain. This course is well suited for candidates who wish to work with software developing firms, laboratories, research centres and public or private companies using GIS data. The programme will be best suited for: ● Young Professionals/ scientists working in software field, space and aviation field etc (both public and private) ● Candidates who aspire to work as legal researchers, telecommunication consultant, data scientists etc. ● Anyone working/looking for a job in the Intelligence, Military etc. ● Graduate and Post-graduate students pursuing their UG/PG program in any college/universities. ● Students pursuing LL.B course/ B.Tech Courses may also apply.
Other institutes offering similar programmes	NALSAR, Online courses in Coursera and Udemy
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of fresh graduates in fields like software industry, becoming scientists, engineers, legal field etc
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL

Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs 5000/- Students- 2000/-
Additional Infrastructural requirements if any needed for the proposed programme	NIL

MOOC COURSE-1

Department proposing the programme	Prof. N R Madhava Menon Interdisciplinary Centre for Research Ethics and Protocols, CUSAT
Name of the proposed Programme	Law Relating to Start Ups and Business Ethics
Nature of the programme proposed	Modification of existing Online Certificate Program (Six months) as MOOC course
Mode of delivery of the programme proposed	ONLINE
Duration of the programme proposed	3 Months
Description of the programme proposed	This MOOC Program is intended to provide a general understanding regarding the foundational laws relating to startups and develop sufficient understanding on the legal nuances and formalities while managing a startup. It will enable the participants to understand the basic legal procedural formalities to be complied with, so as to operate and manage startups in India.
Justification for launching the programme proposed	Market viability: As the course is a much-needed requirement for all aspiring entrepreneurs who want to establish start-ups and also for those who are already managing start-ups has great market potential. Admission Criteria: ☐ Candidates with minimum of 45% in their plus two may apply for the course. ☐ Anyone interested in initiating a start-up. ☐ Anyone who wants to develop or enhance their market/managerial potential being a start-up.
Other institutes offering similar programmes	NPTEL, Coursera, Startup India
Expected graduate outcomes of the proposed programme	Become entrepreneurs

Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	25
Proposed fees for the proposed programme	Rs5000/- Students-2000/-
Additional Infrastructural requirements if any needed for the proposed programme	NIL

MOOC COURSE-2

Name of the proposed Programme	IPR, Biotechnology and Bioethics
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	MOOC/Hybrid
Duration of the programme proposed	30 hours
Description of the programme proposed	This inter disciplinary MOOC programme titled IPR, Biotechnology and Bioethics, intends to cover the interface between IPR and biotechnology and the bioethical issues which it raises. Biotechnology has Become one of the most promising but controversial technologies of the 21st century. It exerts great influence In the life of a common man from his/her food to his/ her medicine. But the technology has also faced great challenges, some of which are ethical while others are legal. Since TRIPS, the technology has become a great talking point in the developing and underdeveloped world due to its patent scope.This course aims to shed light on the emerging issues that biotechnology has created in the patent framework and the ethical dilemmas It has prompted. The objectives of the programme include ● Understand and get familiarized with the IP regime ● Identify areas of ethical challenges the IP regime had prompted in the area of biotechnology.

	● Examine niche areas where innovative urge to Secure patent interests by the scientist over rides ethical compliance.
Justification for launching the programme proposed	It is a known fact that most of the individuals who are involved in biotechnological research and innovation, hardly know about the legal and ethical framework in this area. This course provides basic insights on all these aspects so that ethical conduct of research becomes the grund norm. The programme will be best suited for ● All the academicians, scientists, researchers and students pursuing their interest in law and biological sciences. ● Any person who has passed plus two with not less than 55% marks having life sciences background. (Both employed or unemployed may apply) ● Graduate and Post-graduate students pursuing their UG/PG program in any college/universities. ● Students pursuing LL.B course/B.Tech Courses may also apply.
Other institutes offering similar programmes	GNLU, TERI School of Advanced Studies, BIRLA Institute of Technology, Sardar Patel University, Gujarat, IIT Kharagpur (course on IP & Biotechnology) Foreign Universities – Columbia University, Stanford Law School
Expected graduate outcomes of the proposed programme	It will enhance the knowledge on ethical conduct of biological investigation. It will throw light on the IP issues in this area. It is useful for careers in research labs, the scientists, Safety and Ethical Officers in CSIR labs, Biotech and Pharma Companies.
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	25

Proposed fees for the proposed programme	Rs 5000/- Students-2000/-
Additional Infrastructural requirements if any needed for the proposed programme	NIL

MOOC COURSE-3

Name of the proposed Programme	Laboratory Safety and Research Ethics
Nature of the programme proposed	Certification
Mode of delivery of the programme proposed	MOOC
Duration of the programme proposed	30 hours
Description of the programme proposed	The MOOC programme titled, "Laboratory Safety and Research Ethics" aims to disseminate the necessity for compliance of various aspects of safety and health standards at work in laboratories, particularly in those where hazardous substances are stored, handled or used. The primary responsibility for safety rests with the individual who is not only manning the laboratory but all those who use the laboratory for research, teaching or for other academic purposes. Therefore, knowledge on certain rules and procedures to be adhered in laboratory perpetuates ethical conduct of scientific research on all those who are engaged in scientific research. The program aims at familiarizing with safety measures to be undertaken in laboratories and the necessary ethical compliances required in this area.

The objectives of the programme include

● Disseminates knowledge on the fundamentals of laboratory safety and ensure safety in research and scientific investigations.
● Understand the risk management principles and standard operational procedures in laboratories.
● Learn the trouble shooting methods available in case of emergencies.
● Apply these principles in the day-to-day functioning of laboratories. |

Justification for launching the programme proposed	While working in a laboratory, one can get exposed to a variety of hazards, making it a potentially dangerous environment. Because of this, it is essential to take proper pdrecautions and implement safety guidelines and to ensure that not only the person who does the research is safe but also others. This course is intended to benefit not only the researchers, scientists, lab assistants, students but all those who undertake scientific investigations in laboratories. The programme will bebest suited for: ☐ Young scientists, students, academicians, lab assistants and all those who undertake scientific investigations. ☐ Anyone intending to setup laboratories ☐ Anyone working in R & D institutions, pharma companies, biotech companies, bio banks, industry etc.
Other institutes offering similar programmes	IIT Mandi, NABL, Indian Chemical Council etc. Foreign Universities - Harvard University,Boston University etc.
Expected graduate outcomes of the proposed programme	It will boost the career opportunities of fresh graduates in research institutions, pharma and biotech companies, industries etc.
Partnership with Industry if any for the proposed programme	NIL
Partnership with foreign universities if any for the proposed programme	NIL
Number of seats in the proposed programme (Minimum 25)	30
Proposed fees for the proposed programme	Rs5000 - Rs.2500/-for students
Additional Infrastructural requirements if any needed for the proposed programme	NIL

2.33 ANNUAL SELF-APPRAISAL REPORT OF TEACHERS NEW FORMAT PROPOSED BY INTERNAL QUALITY ASSURANCE CELL (IQAC)

(To be completed and submitted at the end of each Academic Year)

Academic Year:

PF No:

PARTA: GENERAL INFORMATION
I. Personal Information

1.	Name (In Block Letters)	
2.	Present Designation	
3.	Name of the Department/School/Centre	
4.	Date of Joining CUSAT	
5.	Joining Designation	
6.	Joining Department/School/Centre	
7.	Aadhar Number	
8.	PAN Number	
9.	Father's Name/Mother's Name	
10.	Sex	
11.	Nationality	
12.	State of Domicile	
13.	Permanent Address with Pincode	
14.	Present Address with Pincode	
15.	Mobile Number	
16.	Office Phone Number	
17.	Email ID	
18.	Date of birth	
19.	Place of birth	
20.	Professional profiles like https://scholar.google.co.in, or https://publons.com	
21.	H-Index: SCOPUS: Web of Science: Google Scholar:	

II. Educational Qualifications
Academic Qualifications (Matric till post-graduation)

1. Academic Qualifications (Matric till post-graduation)

Name of the Examination/ Degree	Name of the Board/ University	Year of Passing	CGPA/ Percentage of marks obtained	Subject of Study

2. Research Degree(s):

Degree	Title	Subject	Date of Award	University

III. Prior Appointments (including teaching/post doc/ industry/administrative prior to joining CUSAT)

Designation	Name of the employer	Date of joining	Date of leaving	Nature of work (Teaching/ Research/ Post Doc/ Industry/ Administrative/ Any other, Specify)

IV. Details of Teaching Positions at CUSAT

Designation	Name of the Department	From Date	To Date	Direct Appointment/ CAS

V. Other Academic/ Administrative responsibilities held at CUSAT

Designation *(Syndicate Member/ Senate Member/ Dean/ Head/ Director/ Principal/ Academic Council Member/ Coordinator/ Warden/ MOOC Coordinator / NSS Coordinator/ Division Head/Placement Coordinator/ IQAC member/ Batch/ Course Coordinator/ Other Responsibilities at department/ Any Other (Specify)*	Type of Responsibility *(Academic/ Administrative/ Any other (Specify))*	Name of the Department/ School/ Centre/ Faculty/ Division/ Office/ Club/Cell/ Unit/ Hostel etc.	From Date	To Date	Continuing (Y/N)

PARTB: ACADEMIC ACTIVITIES

I. Teaching, Learning and Evaluation related activities

1. Teaching Activities done during the year

Program Name	Name of the Course	Semester	Mode of Teaching (Lecture, Practical/ Remedial))	Number of hours per week	Number of students enrolled

2. MOOC Courses developed

Name of the Course	Credit of the Course	Availability of e-content (Yes/No)	Availability of online videos (Yes/No)	E- content Platform (Swayam/ e-Paathsalaetc)	Link to e-content	No. of students enrolled

3. Teaching Contributions/ Innovations made during the year

Sl. No.	Name of the new courses/ lab work/ experiments designed /introduced during the year	Type (course/ lab work/ experiments/)	Name of the Program in which contributions made	Semester

4. Remedial Classes/ Students Counseling conducted during the year

Sl. No.	Details of Remedial Teaching/ Student Counseling	Type (Remedial Teaching/ Student Counseling)	Name of the Program for which classes taken	Semester	Number of hours per week	Number of students attended

5. Students Mentoring done during the year

Sl. No.	Name of the Program for which mentoring done	Semester	No. of students mentored

PARTC: RESEARCH ACTIVITIES
I.   Research Works

1. Guidance for UG/PG Students during the year

Name of the Academic Program	Semester of Study	No. of students supervised

2.   Guidance for Research Students during the year

PhD/PDF	No. of students supervised	No. of PhDs awarded during the year

II.   Publications

1.   Research Publications

Sl. No.	Title	Journal, Vol, page Nos.	ISSN/ ISBN No	Whether Scopus/ SC Indexed peer reviewed journals/ UGC-CARE listed Journals/ Any Other, Specify	Impact Factor, if any	No. of Citations	No. of Co-authors	Whether you are the main Author/ Corresponding Author	DOI/ Web link

2. Books and Monographs Authored/Edited

Sl. No.	Author (s)	Name of the Book	Year of publishing	Authored/ Edited /Translation/ Book Chapter(Specify)	ISBN	Name of the publisher

3. Full paper publications in Conference Proceedings

Sl No	Title	ISSN/ISBN No	Details of Conference	Date of event	National / International Seminar

4. Publications other than Research Publications

Sl No	Title	Details of Publication	Type of Publication (Online/ Article in Newspaper/ Magazine/ Any other (specify)	Published Date

III. Research Projects/ Consultancy Projects
1. Ongoing Research Projects

Sl. No.	Title of the Project	Funding Agency	Total Outlay in Rs.	Principal Investigator(s)	Role of the faculty member	Duration	Start Date	End Date	National/ International

2. Consultancy Projects undertaken

Sl. No.	Name of the Consultancy Work	Name of the Client Firm	Name of Consultant Teacher (s)	Start Date	End Date	Total Out lay in Rs.	University's Revenue in Rs.

3. FDP/MDP conducted

Sl. No.	Name of the FDP/MDP	No. of Participants	Total revenue generated	Funding Agency, if any	Programme Date

4.   Startup Mentorship

Sl. No.	Name of the Start-up	Role of the teacher (Founder / Mentor)	Period of association	Whether incubated in CUSAT (Y / N)	Registration details of the start-up

IV.   Seminars/ Conferences
1.   Seminars/ conferences organised

Sl.No.	Title of the Programme	Seminar/ Conference/ Workshop/ Refresher Courses/Training Programme/ Any other(Specify)	National / International/State level	Duration From : To:	Role of the faculty member	Funding Agency	Amount of fund received (Rs.)

2.Participation in Seminars/ conferences / refresher courses/FDPs/ public lecture/ workshops etc.

Sl.No.	Title of the Programme	Name of the Organising Institute	National / International/State level	Duration From : To:	Role of the faculty member *(Paper presenter/ Resource Person/ Panelist/ Chair/Invited talk/ Participation /Any other(Specify)*

V.   Research Collaborations with National/International Institutions/ Inter-Governmental Programs

Sl. No.	Name of the Collaborating Institute	Type of Activity	Period of Collaboration	MoU Collaboration (Y/N)	Nature of output (Publication/Research Project/ Foreign visit / any other (specify)

VI. Details of Patents filed/published/granted OR Technology Transferred

Sl No	Name of Patent	Applied/ Published/ Granted OR Commercialized/ Technology Transferred (Specify)	Name of Inventors	Type of Patent (National/ International)	Date of Filing/ Publishing/ Granting/ Commercialization/ technology transferring	If a technology transfer, Name of the firm	Income generated (in Rs.)

PART D: PROFESSIONAL CONTRIBUTIONS

I. Members of Expert Committees/ Advisory Boards/ Editorial Board etc.

Name of the Committee	Name of the Organization/ Institute/ Ministry/ Name of the journal etc.	Role of the Faculty member / Nature of participation	Start Date	End Date	Continuing (Y/N)

II. Evaluation of PhD Thesis

Name of the PhD Thesis	Name of the University	Month & Year of evaluation

III. Reviewing of Research Papers

Name of the Research Paper	Name of the Journal	Month & Year of reviewing

PART E: ACHIEVEMENTS

I.   Award/ Fellowships/ Recognitions

Name of the Fellowship/ Honour /Award	Awarding Agency/Institute	Date of award	National/ International/ State/ University level

PART F: OUTREACH/ EXTENSION ACTIVITIES/ COMMUNITY SERVICES

I.   Extension/ Field based/NSS Activities / Community Services conducted

Name of the Activity (medical camp, village adoption, school adoption, blood donation camp, cleaning drives, training programmes, talks, camps, awareness programmes, science camps, others (specify))	Target Group	Place of the activity	From & To Date	National/ International/ State/ University level

PART G: Any other Outstanding/ Significant Contributions

Name of the contribution	Details of the contribution

3. GENERAL OBSERVATIONS AND REFLECTIONS FROM THE INTERACTION WITH ACADEMIC COMMUNITY UNDER VARIOUS FACULTIES

3.1 Observations and Reflections for the Faculty of Social Sciences and the Faculty of Law.

School of Management Studies (SMS) is one of the pioneering management institutes in the country with a rich legacy of 60 years. The institute offers high quality management education, at the lowest possible fees, with focus on developing entrepreneurial skills and motivation among the youth of Kerala.

Business schools have been making incredible growth nationally as well as globally in recent times. Modern business schools provide excellent learning ecosystems for superior learning outcomes. They need round the clock accessibility to digital resources, library and knowledge centres. Most management institutes offer residential programmes since the current learning pedagogy relies largely on group assignments that entail round the clock student interactions. Executive programmes require 24 hours learning ecosystem. Industry oriented programmes such as MDP and EDP programmes, targeted at industry professionals, require state of the art residential accommodation. In general, management education programmes require excellent teaching and learning infrastructure support.

SMS was one of the pioneering management institutions in the country, but it has been stagnant for the past few decades.

The school proposes the following programmes to be initiated in future.

1. Executive Education Programmes

- Executive MBA Programme
- Diploma / Certification programmes for Executives

2. Online Education Programmes

- Online Courses
- Online MBA Programme
- Online Diploma / Certification programmes

3. Integrated B.Com / BBA – MBA Pogramme

As far as the School of Management Studies proposals for an Executive MBA is concerned, in the long term this is a desired program to initiate. There is a market for a hybrid

format Executive MBA from SMS. National institutes in the vicinity have been actively and successfully conducting programs of such a nature. SMS with its heritage and ability to have a very compelling price proposition in this space, is uniquely positioned to exploit this space. However, this is best pursued after the desired modifications to the existing part time MBA program is implemented. Also, the hybrid program will necessitate increased investments in course creation and infrastructure to deliver more content online. With regard to SMS's proposal on the integrated MBA, this can be considered in the future as a good undergraduate offering in management which feeds into the graduate program at an attractive price point is a space which in the vicinity of school geographically is currently in short supply.

The online space can be well exploited by the School of Management Studies. Given the large number of MBA students in the state and in the country, they can offer high quality online courses in management with credit transfer support. Progressively, it can be expanded into an Online MBA programmes.

Integrated MBA programmes are promoted by AICTE and are becoming popular. Many Business schools including an IIM has started similar programmes. SMS can study the local market and can start such a programmes in future.

The school should also get into Management Development Programmes (MDPs), Faculty Development Programmes (FDPs) , Management Consultancy, Community Development and Outreach programmes.

For this purpose, the school should have sufficient quality infrastructure in terms of Smart Classrooms, Seminar halls, IT & Communication Facilities for Online Programmes, MDP / FDP Training Hall with Computers, Hostels, and sufficient space for Faculty and Office. The available infrastructure is highly inadequate, particularly in comparison with the best Business Schools within the state and outside.

There is a market and the need for a good undergraduate program in economics in the vicinity of the department geographically. CUSAT has a well-established Department of Applied Economics. Since its inception, the Department has strived towards enhancing the quality of higher education in the field of Applied Economics. The courses offered by the department include M.A. Applied Economics, M.Phil. Applied Economics and PhD. Now the university has sanctioned a centre of excellence in Budget Studies which is offering research and academic programmes.

There is a need for a five-year integrated PG programme in economics. The existing PG programmes in Applied Economics and Econometrics and Financial Technology should be strengthened. In line with the philosophy articulated in the first paragraph of this section, it's ideal if the Masters' and the integrated five year Masters is housed in the Department of Applied Economics. The Centre for Budget Studies should ideally be the vehicle for specialized research on budgetary and fiscal matters and its offerings should strengthen the uniqueness of both the Masters' and the integrated five year Masters' program.

DDU KAUSHAL KENDRAS (DDUKK) of CUSAT was established for promoting vocational education in continuation to its initiatives for introducing community colleges and B.Voc Programmes realizing the importance and the necessity for developing skills among students, and creating work ready manpower on large scale. DDUKK aims at providing quality vocational education combining classroom cantered formal education and training with experience sharing of Industry practitioners and internships in business houses.

Given the paramount importance given to vocational training in the New Education Policy-2020, DDUKK can have more offering and programmes in future. The proposed offering of the integrated Masters' in Vocational Education may be considered as it is in line with the national imperative of adequately skilling large sections of our population. In line with the philosophy of having a structure in which Departments and Schools are allied to respective faculty disciplines, it would be ideal to restructure/elevate the centre to a department under the Faculty of Social Sciences, so that its line with our thought process that courses should ideally be offered by departments and schools. This new department should house vocational and skilling programs and should ideally be the principal vehicle for such courses and training activities of the university. They need to be given sufficient infrastructural support in line with the proposed expansion.

School of Legal Studies (SLS) is one tne of the oldest law schools in Indis. SLS was established in the year 1962 as a part of Kerala University offering post graduate courses and research in law under the leadership and guidance of the late Prof. (Dr.) A. T. Markose, an internationally acclaimed jurist and academician. SLS offers LL.B., LL.M. and Ph.D. programmes. From 2009, as per the directions from the Bar Council of India, the 5 Year LL.B. course had been restructured and a B.B.A. LL.B (Hons.) programme is offered in its place.

The law school in CUSAT is strengthened by the establishment of Prof. N. R. Madhva Menon Interdisciplinary Centre for Research Ethics and Protocols (ICREP) in 2020. The ICREP is envisaged as an independent and autonomous research centre which would undertake research and academic programs in the field of bioethics as well as in all areas of application of research

ethics. The Centre would explore the possibilities of collaborative research, teaching, and exchange of scholarship with institutes of international repute that specialize on Bioethics. The school is now proposing a Five-year BSc (Computer Science) LLB Programme.

The proposed new BSc LLB programme is unique and truly interdisciplinary. It answers the market demand for lawyers well versed in computers. In line with the philosophy articulated earlier, we argue for a stronger linkage between SLS and ICREP for academic programmes. The N R Madhava Menon interdisciplinary centre should provide specialized inputs based on its expertise to enhance the offerings of the integrated program. SLS should also explore the possibility of starting the Executive LLM to enhance the uniqueness of the respective program offerings.

3.2 Observations and Reflections for the Faculty of Engineering

Faculty of Engineering consists of two departments

1. The School of Engineering has seven divisions presently, namely, Civil Engineering, Computer Science Engineering, Mechanical Engineering, Electronics Engineering, Electrical Engineering, Information Technology, Safety and Fire Engineering, with 60 permanent faculty members.

2. Cochin University College of Engineering Kuttanad (CUCEK) has six divisions Civil Engineering, Computer Science Engineering, Mechanical Engineering, Electronics Engineering, Electrical Engineering, Information Technology with 18 permanent faculty members.

The total student intake is approximately 900. There is a high percentage of contract faculty members who are appointed for one year and renewed for a maximum of three years. Most of the permanent faculty members are Doctoral degree holders from prestigious institutes like IIT's, IISc, NITs etc. Many of them have produced PhD's and international publications.

All the departments offer B.Tech undergraduate programmes in their respective streams. The programmes at SOE are presently NBA accredited under Tier-I. There are five Mtech programmes offered by CE, CS, IT, ME and SE divisions. However, the seats are only partially filled in many of these programmes.It is observed that there is good campus placement opportunities and majority of students receive placement offers during their final year studies. Branches like Safety are Fire Engineering are novel and offer potential for growth

As most of the senior faculty members are on the verge of retirement, there are no second or third layer of faculty members in many of the departments. This has to be addressed immediately. Steps should be taken to make the school a constituent department of the University. The government should be urged to provide sufficient financial assistance. Tenure appointment with an attractive salary should also be considered instead of one year contract apartment. Infrastructure requirements for the existing programmes are moderate, introducing new programmes needs additional developments. Also hostel facilities for students are very limited.

The importance of having state of the art Engineering Programmes in a Science and Technology University can't be underestimated. It is in the interest of the university in general and the state in particular that the engineering programmes are made top notch. General suggestions to improve the functioning of the school include

- Department should engage more with industry and the curriculum must be designed with more industry components.
- Laboratories need urgent up-gradation. Majority of the laboratories are with age old equipment, this needs modernization.
- The engineering curriculum must be revamped in tune with NEP.
- Interdisciplinary/ Inter Department programmes must be encouraged.
- The school should improve the income generation from the programmes and projects
- Departments should explore the possibility to start new programmes in collaboration with international partners.
- The school being the largest academic unit of the University, individual divisions shall be given department status for greater academic and administrative autonomy.
- The school should try to bring more international students and students from diverse culture.

The following general suggestions pertains to the general modifications engineering education curriculum.

- The engineering curriculum should be designed towards socially relevant and outward-facing engineering curricula. Such curricula should emphasize student choice, multidisciplinary learning and societal impact, coupled with a breadth of

298

student experience outside the classroom, outside traditional engineering disciplines and across the world.

- Experiences such as work-based learning and socially - relevant design projects are to be embedded into the programs in a way that provides a solid platform for student self-reflection and a pathway for students to both contextualize and apply the knowledge and skills they have gained elsewhere in the curriculum.

- The curriculum should be delivered through multidisciplinary design projects, which contextualize and integrate learning across courses and years of study.

- Engineering programs should increasingly deliver student-cantered learning t through a blend of off-campus personalized online learning and on-campus hands-on experiential learning

- There should be pathways and linkages for students to engage with the university's research activities, often building upon rigorous, applied teaching in the engineering fundamentals

- A wide range of technology-based extra-curricular activities and experiences should be available to students

- Multiple opportunities for hands-on, experiential learning throughout the curriculum, often focusing on "problem identification as well as problem solution," and typically supported by state-of-the-art maker spaces and team working areas

- The application of user-cantered design throughout the curriculum, often linked to the development of students' entrepreneurial capabilities and/or engaged with the social responsibility agenda

- Emerging capabilities in online learning and blended learning

- Longstanding partnerships with industry and transform the engineering curriculum as well as the engineering research agenda in tune with their demands.

- Consider non-conventional student entry requirements or selection processes

- Increase integration of work-based learning

- The blending of off-campus online learning with on-campus intensive experiential learning

- The establishment of student-led, extra-curricular activities in contexts and cultures that are not typically associated with non-curricular experiences

- Dual emphasis on engineering design and student self-reflection.

- The programs should called upon students to engage in exploratory and open-ended problem-solving skills and address challenges that spanned multiple disciplines.

- Students projects should have a hands-on component and are supported by open-access state of the art maker spaces.

- By the time the student complete the degree program, every student should have participated in minimum of 5 intensive design projects.

- The programme should offer breadth of experience not traditionally associated with engineering undergraduate study, including research opportunities, industry internships, undergraduate teaching opportunities also should cover courses in humanities and social sciences.

3.3 Observations and Reflections for the Faculty of Marine Sciences

School of Marine Sciences, Cochin University of Science and Technology, established as Oceanographic Laboratory of erstwhile Travancore University as early as in 1938 has over the years developed into a full-fledged School of Marine Sciences (SMS). This school is one of its kinds in India with all branches of Marine Sciences such as Marine Biology, Physical Oceanography, Chemical Oceanography, Marine Geology and Atmospheric Sciences under the same School. Various departments of School of Marine Sciences has actively participated in various flagship marine science research programmes of Govt. of India recognized by Ministry of earth sciences of Govt. of India by instituting an Ocean Science and Technology Cell. At present various departments of School of Marine Sciences are recognized at national level and supported under DST- FIST, UGC- SAP and KSCSTE - SARD and this has helped the departments to considerably augment the research infrastructure to take up research at frontier areas in marine sciences.

School of Marine Sciences has the potential to develop into a centre of excellence which could take its research activities to further heights on par with international standards. This will also give further credibility to this school, which can then act as 'think tank centre' for issues related to marine sciences. Although 2/3rd of the earth is covered by oceans, the understanding about it is relatively less, due to the rigors involved in marine science research. Significant infusion of research grants is required for further development of SMS to a centre of excellence.

The thrust areas of research envisaged under the school are

- Marine Biodiversity and Conservation:
- Marine Natural Products/ Marine Pharmacology/ Drugs from the sea:
- Microbial Oceanography:
- Harmful algal blooms:
- Ecology and Climate Science:
- Fisheries and Aquaculture:
- Disaster Management and Mitigation:
- Biomarkers of Pollution:
- Air-Sea Interactions, Climate Dynamics and Regional Climate Modelling:
- Remote Sensing and Ocean Forecasting:
- Aquatic Animal Health Assessment and Management
- Genomics and Proteomics of Aquatic Organisms
- Molecular breeding and transgenesis
- Live feed organisms
- Aquatic animal cell culture
- Marine Bio prospecting for novel aquaculture medicines

The school can also come out with new generation programmes such as

  i. Five-year Integrated M.Sc. in Geosciences with specialization in Marine Geology/ Marine Geophysics (sanctioned)
 ii. M.Tech in Exploration Geophysics
iii. M.Tech in Geoinformatics
 iv. Certificate course that suit the needs of Industry – different disciplines
  v. M.Tech in Marine Pharmacology

Sufficient support in terms of Infrastructure, equipment and faculty may be provided to make it the best marine science department in the country.