To,
The Vice Chancellor
Amrita Vishwa Vidyapeetham

Dear Sir,

Subject: Submission of Strategic Plan for Amritapuri Campus

I am writing to formally submit the Strategic Plan for Amritapuri Campus for your review and approval. This document has been meticulously prepared by Members over the past few months, incorporating comprehensive feedback from faculty, staff, students, and stakeholders. The Strategic Plan outlines our campus's vision, mission, and strategic objectives for the coming years.

We believe this Strategic Plan aligns with the goals of Amrita Vishwa Vidyapeetham and will significantly contribute to our campus’s growth and success.

Sincerely,

[Signature]

Dr. Balakrishnan Shankar
Dean, School of Engineering
Amrita Vishwa Vidyapeetham
Amritapuri Campus

Enclosure: Strategic Plan for Amritapuri Campus
Strategic Plan

Amrita Vishwa Vidyapeetham, Amritapuri Campus is a multi-disciplinary, research-intensive, university campus, comprising diverse student population, well-qualified faculty, innovative group of researchers and guided by a dedicated, far-sighted administration. The campus has a long-drawn-out plan in many spheres of academia & research.

Leading the academic and administrative governance is world renowned humanitarian leader Shri Mata Amritanandamayi Devi (Amma). Amma has been relentlessly supporting education, innovation and research towards upliftment of society.

Amma’s profound mission of providing education for life, and emphasis on compassion driven research, has shaped Amrita as a unique institution:

Education for Life

There are two types of education: education for living and education for life. Studying to become a professional is education for a living, while, education for life requires an understanding of the essential human values. At Amrita, we believe that education should also impart a culture of the heart, based on enduring values and inner strength. Amrita’s culture of education helps to inculcate in our students the right ethos to be rooted in the values of Dharma (rightousness), Karuna (compassion), and Shraddha (mindfulness). Endowed with qualities of acceptance, patience, self-confidence, perseverance, and enthusiasm, the benefit of humanity will become uppermost in the students’ thoughts, words and actions. They will then pioneer innovative solutions for the benefit of all humankind, leading to sustainable health and prosperity for all. This resonates with the ancient Sanskrit prayer ‘Lokah Samastah Sukhino Bhavantu’. It is a reminder of our deeper connection to the entire world around us, “May our work contribute to the happiness of all beings.”

Compassion Driven Research

Our motivation to pursue research is focused on alleviating major global problems related to poverty, starvation, sickness, environmental pollution, and sanitation. We believe that if we could transform compassion from a mere word into a path of action, we would be able to address most of the world’s problems. If we take this step courageously, then our research and its outcomes will have a special impact, spontaneity, and power. This has translated into many latest advancements and innovations that have culminated in greater societal benefit.

Global Impact

At Amrita, we stand united in our mission towards solving globally recognized scientific and societal challenges, including environment, development, and health. Amrita stands at the strategic juncture of two streams of cultures: East and West. It is our vision to bring the two together to bridge the divide through meaningful collaborations with world-class universities and innovative approaches that will benefit the entire planet.
Five Strategic Pillars

Quality and commitment have been the corner stones for the success of Amrita. Being a multi-campus, multi-disciplinary university, decentralized administration was essential to maintain agility and quality. Amrita’s strategic plan for academic and research excellence is driven by the following five priorities, the key five strategic pillars:

- Inter-disciplinary
- Innovation
- International
- Industry
- India

Building on these strategic pillars is absolutely critical for Amrita to be recognized as a world class university

a. Inter-disciplinary:

Holistically addresses national and global challenges. To bring together multiple related disciplines to tackle complex problems faced in societal applications.

Offers degree programs that are inter-disciplinary/intra-disciplinary in nature. The degree programs are designed to fit with the thematic research areas of the school.

Initiate and secure funds for inter-disciplinary projects from Govt. agencies and industry.

More programs involving automation & rural technology, e-mobility in electrical vehicles, sensors for health applications, cyber physical systems, security and forensics, data analytics and medical systems, vision-based systems for smart
transportation and bioinformatics, data analytics and machine learning, Robotics, AI, are being introduced. A new school of AI & DS has been established. Two new centres on smart vehicles and flexible electronics and advanced materials have also been started.

b. Innovation:
Innovative teaching-learning process: Strengthening the curriculum and introducing pedagogical changes that would trigger better knowledge gain. Introduction of modular mathematics courses was implemented in 2015. Presently a Spiral learning Methodology for Teaching Mathematics has been introduced wherein the approach is based on revisiting and building upon previously learned material in a spiral fashion. This approach contrasts with linear learning, where new concepts are introduced and learned in a strict sequential order.
Introduces flexible curriculum with open electives across all engineering departments. We have introduced minors & specialisations in departments. For e.g. minor in AI and data science, specialisations in robotics and automation, etc., in the 2023 curriculum.
Carry out innovative research that can result in patents and entrepreneurship.

c. International:
Currently, more than 180 MoU’s have been signed with foreign universities, which allow student exchange programs, dual degree programs, internships and projects. The strategic plan calls for an additional 100 MoU’s with universities ranked in the top 500 of the world ranking. We are also planning international joint centres of excellence in thematic areas like water, sustainability, advanced materials etc. Work with World Organizations such as UN, EU, and UNDP etc. to translate and scale research outcomes to achieve UN SDG goals.

d. Industry:
Amrita’s engagement with industry is critical to ensure that
i. the curriculum and pedagogy matches with the needs of the industry;
ii. to ensure that the research problems chosen are industry relevant problems and
iii. industry gets a chance to assess the calibre and quality of Amrita. Goal is to increase the industry consultancy.
e. India:

The founding trust of Amrita has adopted 103 villages across India. Experiential learning (named as Live-in-Labs), introduced in 2015, is part of the curriculum. Primary goal is to ensure that the society benefits from all the research work done at Amrita. Some of the goals envisaged are:

- Become role models in promoting green, clean and sustainable practices.
- Focus on National Missions such as Education, Literacy, Empowerment, Water, Disaster management and develop implementable and adaptable solutions.
- Orient research objectives and work with communities for societal impact through Amrita’s adopted villages program across India and other initiatives.
- Develop university-wide initiatives that embrace, appreciate and incentivize societal impact. This can be in the form of extension activities as well.

Monitoring the implementation of the strategic plan is handled by the Board of Management, which is the Apex body of Amrita.
Academic Plan

- Personalized Academic Pathways to provide a flexible academic program that is personalized to the needs of the students.
- Integrate choice based credit system and increase flexibility in the curriculum.
- Recruit expert faculty in strategic areas to enable teaching and research.
- Introduce new interdisciplinary electives across the board.
- New BTech programs like BTech Aerospace and BTech civil engg to be started.
- New MTech programs in AI in Power systems (EEE), System dynamics and control (EEE), MTech in Digital signal processing and RF (ECE).
- Transform learning experiences to be participative, activity and project-oriented.
- Amrita Values program, cultural education and exposure to societal needs should be integral to every student’s education. Periodic exposure and training for holistic well being such as Amrita Yoga, IAM Meditation and their integration.
- Introduce novel programs to align to national and industry requirements having focus on employability/entrepreneurship/skill development.
- Aspire beyond program objectives. Enhance training and mentorship to create showcasable talent at regional, national and global forums.
- Accommodate students with a wide range of proficiencies from all strata of society and mould them into extraordinary human beings who are motivated to serve society. Towards this end, the university will be structured with a graded learning environment which will provide adaptive learning for slow learners, average students, and exceptional performers. In addition, the university plans to inspire students from disadvantaged backgrounds to dream higher, provide the essential bridge training, and compensatory exposure to build self-confidence and communication skills.
- Experiential Learning to provide students with real world environments beyond the classroom and the labs.
Research Plan

The campus envisions starting various Centers of Excellence in several thrust areas in order to inculcate, develop, and promote advanced research among faculty and students in these areas. The strategic plans for the Research Centres and Thrust Area Groups (TAG) are as follows:

- Intelligent Electric Grids and eMobility
- AI in Power System Operation and Control
- Embedded Control and Automation
- Power Electronics & Power Systems
- VLSI Design
- Electromagnetics
- Communication and Signal Processing
- Flexible Electronics and Advanced Materials
- Robotics
- Aerospace Engineering
- Additive Manufacturing

Listed below are some of the goals & objectives of a few of the above centres of excellence:

Intelligent Electric Grids and eMobility

I. Amrita Center for Intelligent Electric Grid and e-mobility (Amrita i-GEM)

- To promote collaborations with industry, reputed academic institutions and other establishments for resource sharing and to promote creativity, innovation and entrepreneurship culture.
- To enhance the teaching learning process by adopting the best and innovative practices through active engagement with all stakeholders in Research, Industry and Business with social and common concern.
- To produce world standards deliverables in publications, patents, PhDs etc.

Near future Goals (5 years)

- To obtain funded research projects from government (DST, DRDO, MeitY, MNRE etc) and industries (TATA Power, Nissan Leaf etc.)
- To start PSSE Software and Training Center
- To set up state-of-the-art Advanced Research facilities for Smart grid and e-Mobility research
• To recruit experts (national and international) to enrich us with high-quality research and exposure
• To improve collaboration with industry and academia.
• To publish papers in reputed tier-1 international conferences and journals (SCOPUS indexed)
• Organize workshops and seminars to be conducted by people from industry and academia here at Amritapuri
• To organize an international conference exclusively on in the next two years so as to bring the people from industry and academia together here at Amrita so as to help improve the research and knowledge of both undergraduate and graduate students along with faculty in the domain.
Intermediate Goals (for the next 5-10 years)

- To continue obtaining funded research projects in the following thematic areas from the government (DST, DRDO etc) and industry
  
  - Cyber resilience in Smartgrid,
  - Smart grid data security,
  - Electric vehicle, Connected Autonomous Vehicles,
  - Blockchain-based Peer to Peer Energy Trading,
  - AI-Enabled Distribution Grid Asset Monitoring and Protection,
  - Hybrid Energy storage system (HESS),
  - Net Zero Energy Buildings, Custom Power Park,
  - Drainage Power Recovery, Power Quality Enhancement,
  - Anomaly detection and Cyber resilience in smart grids,
  - Self-healing protection in smartgrids using ML/MAS techniques,
  - Digital twin in smartgrids,
  - Marine electric transportation,
  - Off shore floating charging stations, Electric vessels, Renewable energy sources,
  - On-board Integrated SRM traction drive, Wireless power transfer

- To set up an Intelligent Electric Grid with the following features;
  
  - Multi Agent System Based Distribution System Automation for Smart Grid
  - Distributed, cyber-attack resilient Smart grid
  - Design and develop a Smart and Energy Efficient Building Technology
  - Smatgrid with vehicle-to-grid capabilities for e-Mobility
  - Design a unified and secure energy trading system for various energy trading scenarios with increased efficiencies, significant cost savings, and a reduction in the wastage of energy

- To publish high quality papers in high impact factor journals and in highly reputed international conferences.
- To improve collaboration with industry and academia.
Future Goals (for the next 10-15 years)

- To focus research and development in the new and upcoming areas of Smartgrid and electric vehicles
- To continue collaboration with industry and academia for a healthy symbiosis

AI in Power System Operation and Control

Near future Goals (5 years)

A. Demonstration of Energy Management System for EV charging station in Microgrid.
C. Demonstration of cooperative control algorithm benefits in path planning of unmanned surface vehicles (USV).

Intermediate Goals (for the next 5-10 years)

A. Development of Decentralized Intelligent Control and Automation algorithms for Hybrid Micro Grid energy management and autonomous systems.
B. Development and usage of modern tools and methods for design, techno-economic analysis for high penetration of Electric vehicles to provide viable energy in low carbon microgrids.
C. Development of AI algorithms for Navigation of Unmanned surface vehicles (USV) for Flood Relief and Water Body Management.
D. Prototype development for cooperative control of USVs

Future Goals (for the next 10-15 years)

A. Development of Scalable and inter-operable Microgrid architecture with renewable energy.
B. Development of re-configurable smart controller for Navigation of Unmanned surface vehicles (USV).
C. Implementation of improved fault tolerant control strategies for autonomous vehicles which work in cooperation
D. Deployment of USVs to assist in offshore operations such as pipeline inspection, and oil spill response
E. Test USVs in locating and rescuing individuals in distress at water bodies by deploying sensors, cameras, and communication equipment
F. Conduct a feasibility study on the deployment of USVs in tourism for autonomous sightseeing tours, underwater exploration experiences, and recreational activities

Embedded Control and Automation

Near future Goals (5 years)
- Establish a track record as a tag leading towards innovative technologies for industrial and national needs.
- To give more emphasis for Participative Learning in teaching that have to be practiced for enhancing the learning capability across the departments through co-curricular, extra curricular activities, Open electives etc.

Intermediate Goals (for the next 5-10 years)
- Incubate successful start-ups under the tag creating innovative products and business models using the knowledge and technologies developed by tag members.
- Become known globally for transformational technologies that impact lives of people.

Future Goals (for the next 10-15 years)
- Provide an invigorating work environment for tag members where merit and hard work are recognized.

Power Electronics & Power Systems

1. Near future Goals (5 years)

To be a center of excellence of global standing for developing professionally competent research talent and contributing to socio-economic benefits on nation building focusing in
- Priorities for research and innovation, accelerating interdisciplinary research.
- Open and responsible research environment: Build and invest in state-of-the-art research infrastructure.
- To strive for clean, practical and affordable energy solutions through research & development as well as demonstration & commercialization.
- To provide research platform for young, talented, innovative, restless minds for proving and actualizing worthy ideas.
• Committed to act with sense of urgency for suitable energy technologies to fulfil energy needs.

2. Intermediate Goals (for the next 5-10 years)

• Developing research leadership, stimulating teaching-learning with research-intensive environment: Engagement, involvement and inspiration.
• Focusing on Reliable and self-Sustainable customer centric smart electric distribution system.
• To become an internationally recognized integrated energy research center and not just restrict itself to energy distribution.
• International collaboration and partnerships, sharing facilities and knowledge with select international partners
• Research funding from international sources, engaging geographic and socioeconomic diversity

3. Future Goals (for the next 10-15 years)

• Energy for ALL in a clean and sustainable way, Ahead of the change, Ahead of the challenge.
• Social responsibility as a core goal: Translating and implementing research discoveries for societal impact.
• Make a difference on grass root social issues at local, national and global scale, embedding responsible research processes for environmental sustainability.

Center of Excellence in VLSI Design

• A dedicated center for design and layout of ICs for signal processing and communication applications
• The center will focus on funded research activities in high-speed data interfaces, verification and hardware security, low power ICs for biomedical applications and GHz rage data interfaces for RF applications

Specific Vision

• To improve the expertise of VLSI graduate students and faculty in the VLSI domain.

Amaravati | Amritapuri | Bengaluru | Chennai | Coimbatore | Delhi NCR | Kochi | Mysuru
Agriculture | Allied Health Sciences | Arts | Ayurveda | Business | Commerce | Computing | Dentistry
Engineering | Commerce | Humanities | Life Sciences | Media & Communication | Medical Sciences | Nano Sciences
Nursing | Pharmacy | Physical Sciences | Social Sciences | Spiritual Studies | Sustainable Development
• To make the resources available for undergraduate and graduate students to enhance their learning and impart knowledge on research and to make them industry ready.
• To facilitate collaboration with VLSI industry and to provide consultancy services.

Near future Goals (5 years)

• To obtain funded research projects in the area for VLSI design from government (DST, DRDO etc) and industry (e.g. Analog Devices, Austria Microsystems, etc)
• To set up state-of-the-art Advanced Research VLSI Lab with high end design tools and board design.
• To recruit experts (national and international) in VLSI domain to enrich us with high quality research and exposure
• To set up a state-of-the art analog VLSI Testing facility up to 1GHZ sampling rate.
• To improve collaboration with industry and academia.
• To publish papers in reputed tier-1 international conferences and journals (SCOPUS indexed) that mainly focus on VLSI Design.
• Organize workshops and seminars to be conducted by people from industry and academia here at Amritapuri
• To organize an international conference exclusively on VLSI Design in the next two years so as to bring the people from industry and academia together here at Amrita so as to help improve the research and knowledge of both undergraduate and graduate students along with faculty in the VLSI domain.
• To ensure most of the faculty in department are PhD degree holders

Intermediate Goals (for the next 5-10 years)

• To continue obtaining funded research projects in the area for VLSI design from government (DST, DRDO etc) and industry (e.g. Analog Devices, Austria Microsystems, etc)
• To set up state-of-the-art fabrication facility for fabricating advanced microelectronic devices such as MOS capacitors and transistors, FinFETs, and Memory devices.
• To set up state of the art device testing facility which will support the fabrication facility by helping in performing all electrical measurements of capacitors, transistors etc.
• To set up a state-of-the-art materials characterization facility for characterization of ultra-thin films used in semiconductor devices.
• To enhance the analog VLSI Testing facility up to 60GHZ sampling rate.
• To publish high quality papers in high impact factor journals and in highly reputed international conferences.
• To improve collaboration with industry and academia.
• To host reputed VLSI Design conferences such as VDAT, VLSI Design in our campus.
• To develop knowledge and expertise in the upcoming new areas of research in VLSI.

Future Goals (for the next 10-15 years)

• To focus research and development in the new and upcoming areas of VLSI and to focus on the latest technology prevalent in the industry at that time.
• To extend and upgrade existing design, characterization, and fabrication facilities to newer technologies.
• To have a pool of experts in VLSI who can initiate, develop and take research to greater heights.
• To continue collaboration with industry and academia for a healthy symbiosis.
• To host reputed International VLSI Design conferences such as ISCAS, IEDM, NEWCAS, and MWCAS in our campus.

Center of Excellence in Electromagnetics

Center for Research in Electromagnetics focusing on Radio Frequency, Microwave, Millimeter waves for Long Range Communication, Reducing Radiation Hazards and using Radiations for the benefit of society.

Specific Vision

• To improve the expertise of students and faculty in the area of Electromagnetics.
To work towards humanitarian projects that can improve the yield in agriculture, fisheries and provide efficient disaster management and non-invasive medical monitoring.

Near future Goals (5 years)

- To continue having International Collaborations through research (joint publications) and to start inviting International experts to handle class (through Skpye or in person) for specific advanced courses
- To set up Advanced Research Electromagnetics Lab with high end design tools and measurement equipments – Communication, Agriculture as well as Medical.
- To obtain funding for research projects in the area of Electromagnetics (RF communication, Medical applications, RADAR, etc.) from Government and non-government organizations.
- To publish papers in reputed tier-1 international conferences and journals (SCOPUS indexed).
- Organize workshops and seminars to be conducted by people from industry and academia.
- Encourage Ph D Students to have an International Mentor

Intermediate Goals (for the next 5-10 years)

- To continue obtaining funded research projects
- To set up the Material Characterization Lab at Radio Frequency.
- To publish high quality papers in high impact factor journals and in highly reputed international conferences.
- To improve International collaborations.
- To develop knowledge and expertise in the upcoming new areas of research.
- To organize the reputed international conference on Advanced Electromagnetics (AEMC) at Amritapuri, National Conference on Communication (NCC which is usually held only in IITs), Symposium on Antennas and propagation etc in Amritapuri.
Future Goals (for the next 10-15 years)

- To focus research and development in the new and upcoming areas focusing on Humanitarian side (phantom model)
- Continue publishing in high quality papers in high impact factor journals and in highly reputed international conferences.
- To further improve International collaboration by setting combined Research Centre in Electromagnetics.
- To host Asia Pacific Microwave Conference (APMC), Progress in Electromagnetics Research Symposium (PIER), and International Microwave and RF conference in Amritapuri

Center of Excellence in Communication and Signal Processing
A dedicated center for communications systems and biomedical signal processing design, development and implementation.

Specific Vision

- Develop extensive curriculum on analog, digital, wireless communications and signal processing focusing both theory and practice.
- Develop a research laboratory which seeds innovation in communication systems design and biomedical signal processing.
- Build a platform where academics and industry come together and reap mutual benefits.

Near future Goals (5 years)

- To obtain funded research projects in the area for wireless communications, biomedical processing from government agency (DST, DRDO etc) and industry (e.g. Qualcomm, Intel, MediaTek, etc.)
- To setup a research laboratory which focuses on 5G wireless technology design and development. This lab will also bring out innovations in biomedical signal processing and application and Internet of Things.

Intermediate Goals (for the next 5-10 years)

- To have a pool of experts in communications and signal processing who can initiate, develop and take research to greater heights.
- To publish high quality research papers in high impact factor journals and in highly reputed international conferences.
• To improve collaboration with industry and academia.

Future Goals (for the next 10-15 years)
• To be a leader in Communication Systems transceiver design, development and implementation
• To innovate Wireless products focusing both on societal needs and technological growth.
• To host and be part of international conferences like ICC, ISIT, PIMRC etc

New center: Center for Excellence in Advanced Manufacturing and Robotics

Specific Vision:
• To become a hub for cutting-edge research and innovation in advanced manufacturing processes and robotics
• To equip students and faculty with expertise in areas such as additive manufacturing, smart manufacturing, automation, and robotics
• Foster collaboration between academia and industry for the development and implementation of advanced manufacturing technologies.

Near Future Goals (5 Years):
• Obtain funding for research projects in advanced manufacturing and robotics from government agencies (e.g., DST, DRDO) and industry partners
• Establish a state-of-the-art Advanced Manufacturing and Robotics Lab equipped with advanced machinery, robotics platforms, and simulation tools.
• Recruit experts in advanced manufacturing and robotics to enhance research capabilities and mentor students.
• Organise workshops, seminars, and industry visits to provide hands-on experience and exposure to the latest technologies.
• Publish research papers in reputable international conferences and journals focusing on advanced manufacturing and robotics.

Intermediate Plans (5-10 Years)
• Expand research activities to encompass emerging areas such as cyber-physical systems, digital twin technology, and human-robot collaboration.
• Develop partnerships with international universities and research institutions for collaborative research projects and knowledge exchange.
• Enhance the curriculum to include courses on advanced manufacturing techniques, robotics, mechatronics, and automation.
• Establish a Technology Transfer Office to facilitate the commercialization of research outcomes and industry adoption of innovative technologies.
• Host international conferences and symposiums on advanced manufacturing and robotics to showcase research findings and facilitate networking.

Future Goals (10-15 Years)

• Pioneer breakthroughs in the field of advanced manufacturing, leading to the development of next-generation manufacturing processes and systems.
• Contribute to the development of sustainable manufacturing practices and technologies to address environmental challenges.
• Establish joint research centers with industry partners to address specific challenges and foster collaborative innovation.
• Expand the scope of research to include interdisciplinary areas such as artificial intelligence, materials science, and renewable energy.
• Strengthen ties with government agencies and policymakers to influence policies related to manufacturing technology and robotics.

Centre for Flexible Electronics & Advanced Materials

This upcoming multidisciplinary research Centre offers state-of-the-art facilities to design, develop, fabricate, and characterize non-enzymatic, flexible wearable sensors for health care and engineering applications, materials for hydrogen storage, artificially engineered materials with a variety of applications like bone/dental implants, micro/nano fluidics, materials for electromagnetic shielding in food packaging, high entropy alloys, energy harvesting and materials with high load bearing capacities.

Another important venture in this center is that it will host Kerala’s hydrogen valley center which is focused on Hydrogen as the future fuel, in collaboration with IIT’s and NIT’s.

Recent works done at the centre developed a low-cost solution for diagnosis of tumour using non-invasive wearable passive sensors. The flexible electrodes developed by the researchers can accurately locate the position of the tumour using ERT (Electrical Resistive Tomography) and has developed a flexible wearable device for targeted localised radiation therapy.
The centre has developed next generation micro fluidic based lab on chip devices in combination with auxetic / meta structures for improved efficiency and modularity. These devices can be used to measure effectiveness of medicine absorption in blood, and can be used to predict diseases.

Applied mechanics group of the center has recently developed a high strength engineering load bearing auxetic members with a significantly high load to weight ratio with 65% of material reduction. These designs with light weight auxetic structures have been utilized in improving the bio-mechanical property of the newly designed bone implants. The auxetic structures developed in the centre produce sustainable implant models with easy post operative recovery.

Biodegradable/ bioabsorbable materials represent a pertinent class of biomaterials which can eliminate the need for revision surgery and minimizes the impact of long-term foreign body response as in the case of permanent implant materials. This research team is working towards the development of novel Mg-based alloys for biodegradable implant applications.

The electromagnetics group of the centre works towards reducing electromagnetic pollution by producing flexible shielding materials using natural polymers. Polymer nanocomposites have been proven to be a significant alternative to metals for reducing the impacts of radiation pollution because they have high impact resistance, low density, and corrosion resistance.

A very promising area of research in the centre is "Mission Hydrogen". The team is working in hydrogen storage using metal decorated 2D materials to achieve the technical targets set by the US Department of Energy (DOE). The newly derived material from this research will be used for incorporating hydrogen fuel cells to store hydrogen, and using that hydrogen, the fuel cells can produce energy with zero-emission. The centre will host Kerala’s ‘Hydrogen valley’ and will participate in India’s ‘Mission hydrogen in collaboration with IIT’s and NIT’s."
In order to incorporate these new centers and related labs, the Amritapuri campus is constructing a huge new Research building with 1.87 lakh sqft built up area.

The research building will also contain state of art labs in biotechnology, physics, materials science, wireless networks.
Infrastructural Plan

3.6 Area Statement of Proposed Projects

The proposed facilities at Amrita Vishwa Vidyapeetham encompass academic, research, residential, and recreational areas. They have been meticulously planned to cater to the specific needs of students, faculty, and staff. The area statement of the proposed facilities is as follows:

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Building</th>
<th>Area</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Library, Admin &amp; Academic Blocks</td>
<td>497575</td>
<td>Sqft</td>
</tr>
<tr>
<td>2</td>
<td>Engineering Annex</td>
<td>165630.07</td>
<td>Sqft</td>
</tr>
<tr>
<td>3</td>
<td>Central Kitchen &amp; Staff Quarters</td>
<td>70000.00</td>
<td>Sqft</td>
</tr>
<tr>
<td>4</td>
<td>Multi-Purpose Complex</td>
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<tr>
<td>5</td>
<td>Boys Hostel</td>
<td>369364</td>
<td>Sqft</td>
</tr>
<tr>
<td>6</td>
<td>Girls Hostel</td>
<td>271348.68</td>
<td>Sqft</td>
</tr>
<tr>
<td>7</td>
<td>Staff Quarters</td>
<td>105318.88</td>
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<tr>
<td>8</td>
<td>Studio apartments</td>
<td>86080</td>
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<tr>
<td>9</td>
<td>International Student’s Hostel</td>
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</tr>
<tr>
<td>10</td>
<td>Research &amp; Development Building</td>
<td>183153.53</td>
<td>Sqft</td>
</tr>
</tbody>
</table>

3.6.1 Library, Admin & Academic Blocks

The Administrative Block & Central Library is an extensive facility encompassing eight floors (G+7) with a built-up area of 497,575 sq.ft, designed to accommodate 4,500 occupants. This comprehensive structure includes 169 rooms, featuring office rooms, AV rooms, lecture halls, conference rooms, an auditorium, exhibition halls, libraries, classrooms, and a cafeteria. The building is equipped with approximately 18 lifts to ensure efficient vertical transportation.
This project aims to provide a centralized and well-equipped space for administrative functions and academic resources, enhancing the operational and educational environment.

3.6.2 Engineering Annex

The Engineering Annex is a cutting-edge educational facility spanning seven floors (G+6) with a total built-up area of 165,629.97 sq.ft. Designed to accommodate 2,462 occupants, the annex includes 54 rooms comprising classrooms, seminar halls, various laboratories (computer labs, heavy machinery labs, etc.), and workshops (mechanical, electrical, etc.). Additionally, the building features approximately six lifts for easy access across floors. Out of the total area, 100,000 sq.ft is equipped with air conditioning to ensure a comfortable learning environment. This annex aims to provide a comprehensive and state-of-the-art space for engineering education and research.
3.6.3 Central Kitchen and Staff Quarters

The Central Kitchen and Staff Quarters is a functional facility comprising ten floors (G+9) with a built-up area of 70,000 sq.ft. The ground floor is dedicated to a central kitchen, designed to efficiently serve the needs of the occupants. The remaining floors are dormitories, providing accommodation for up to 640 staff.

3.6.4 Multi- Purpose Complex

The multi-purpose complex is a versatile facility spanning four floors (G+3) with a built-up area of 141,568.24 sq.ft. Designed to accommodate up to 1,000 occupants, the arena features an auditorium, an extensive indoor sports area with volleyball courts, badminton courts, table tennis, and pool tables, as well as a mess hall. This arena aims to provide a comprehensive space for sports, events, and dining, fostering both athletic and communal activities.
3.6.5 Boys Hostels

The Boys Hostel Complex is a modern residential facility meticulously designed to offer a secure, comfortable, and stimulating environment for male students. The complex features three buildings named Anandham, Brahmam, and Chaitanyam, encompassing a total built-up area of 369,364 sq.ft. Each building is equipped with amenities tailored to foster the well-being and holistic development of its residents.
3.6.6 Girls Hostels

The Girls Hostel Complex is a state-of-the-art residential facility designed to provide a safe, comfortable, and enriching environment for female students. The complex comprises five buildings named Narmada, Godavari, Mandakini, Kalindi, and Krishna, collectively covering a total built-up area of 271348 sq.ft with amenities such as cafeteria, gym, recreational area, indoor and outdoor sports facilities and dining areas.
3.6.7 Staff Quarters

The Staff Quarters is a ten-floor (G+9) residential facility with a built-up area of 81,130.40 sq.ft, designed to house 120 occupants. This complex features 40 spacious units, each consisting of three bedrooms with attached baths, a kitchen, a hall, and a dining room. Each floor accommodates four such units along with a lounge area and a lift, ensuring convenience and community interaction. Each unit is provisioned for the installation of a split AC unit, which can be added upon the user’s request.

3.6.8 Studio Apartment

This Residential Complex is an eight-floor (G+8) building spanning an area of 85,972.40 sq.ft, designed to accommodate 432 occupants. Each floor comprises 54 single occupancy units, providing a comfortable living space for individuals. Each unit is equipped with essential amenities including a kitchen, bathroom, and bedspace, ensuring convenience and privacy for the residents. Additionally, provision has been made for the installation of split AC units in each unit, with installation subject to the user’s preference.
3.6.9 International Student’s Hostel

The International Studio Apartment is a four-floor (G+4) residential complex covering a total built-up area of 37,496 sq.ft, designed to cater to the needs of international residents. With a capacity to accommodate 92 occupants, the apartment offers single occupancy rooms, each equipped with a kitchen, bathroom, and bedsapce.

Every room is furnished with a split AC unit, ensuring comfort and climate control for residents. This project aims to provide a contemporary and convenient living space for individuals seeking international standards of accommodation.
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1. Introduction

Overview of Campus
Amrita Vishwa Vidyapeetham, Amritapuri Campus, is a part of the esteemed Amrita Vishwa Vidyapeetham Deemed to be University established by the world-renowned humanitarian and spiritual leader, Sri Mata Amritanandamayi Devi (AMMA). The campus, situated amidst the serene backwaters of Kerala, embodies a harmonious blend of modern education and traditional values.

Purpose of Strategic Plan
The strategic plan for Amrita Vishwa Vidyapeetham, Amritapuri Campus, serves as a comprehensive roadmap outlining the institution's vision, mission, goals, and strategies for achieving excellence in education, research, and service. It is a dynamic document that guides decision-making, resource allocation, and institutional development.

Guiding Vision and Mission: The strategic plan articulates the overarching vision and mission of the institution, providing a clear direction for all stakeholders. It ensures alignment with the core values and ethos of Amrita Vishwa Vidyapeetham, and serves as a beacon for the pursuit of excellence in all endeavors.

Setting Strategic Goals: By delineating strategic goals and objectives, the plan establishes clear benchmarks and milestones for the institution's progress. These goals encompass academic excellence, research innovation, industry collaboration, student support, infrastructure development, internationalization, and community engagement.

Promoting Continuous Improvement: The strategic plan embodies a commitment to continuous improvement and excellence in all aspects of institutional functioning. It encourages innovation, experimentation, and adaptation to changing circumstances, fostering a culture of learning, resilience, and agility.

Facilitating Accreditation and Recognition: A robust strategic plan strengthens the institution's case for accreditation and recognition by accrediting bodies, regulatory agencies, funding organizations, and industry partners. It demonstrates the institution's commitment to quality assurance, continuous improvement, and adherence to best practices in higher education.

2. Institutional Profile

Institutional Background:
Amrita Vishwa Vidyapeetham was founded in 2003 and has rapidly emerged as one of the premier multi-disciplinary research universities in India. The institution is accredited with the highest grade 'A+++' by the National Assessment and Accreditation Council (NAAC). It boasts a diverse community of students, faculty, and staff hailing from across the globe, fostering a rich cultural and intellectual environment.

Vision of the Institution
To be a global leader in the delivery of engineering education, transforming individuals to become creative, innovative, and socially responsible contributors in their professions.
Mission of the Institution
- To provide best-in-class infrastructure and resources to achieve excellence in technical education
- To promote knowledge development in thematic research areas that have a positive impact on society, both nationally and globally
- To design and maintain the highest quality education through active engagement with all stakeholders—students, faculty, industry, alumni and reputed academic institutions
- To contribute to the quality enhancement of the local and global education ecosystem
- To promote a culture of collaboration that allows creativity, innovation, and entrepreneurship to flourish, and
- To practice and promote high standards of professional ethics, transparency, and accountability

Infrastructure and Facilities:
Amritapuri Campus spread across lush greenery, providing a conducive environment for learning and personal growth. It features state-of-the-art classrooms, laboratories, research centers, libraries, and recreational facilities. The campus also houses Auditoriums, halls, dining facilities, healthcare services, and sports amenities to cater to the holistic development of students.
Facilities include:
- State-of-the-art classrooms equipped with audio-visual aids.
- Advanced laboratories.
- Research centers.
- Libraries stocked with a vast collection of books, journals, and digital resources.
- Auditorium/halls for students.
- Dining facilities.
- Medical clinic.
- Sports amenities for physical fitness and recreational activities etc.

Academic Offerings:
Amrita Vishwa Vidyapeetham, Amritapuri Campus, offers a wide range of undergraduate, postgraduate, and doctoral programs in engineering. The curriculum is designed to blend theoretical knowledge with practical skills, preparing students to excel in their chosen fields and contribute meaningfully to society.

Research and Innovation:
The campus is committed to fostering a culture of research and innovation, with dedicated centers of excellence and thrust areas in various disciplines. Faculty members and students engage in cutting-edge research projects, collaborate with industry partners, and publish their findings in reputed international journals, contributing to advancements in science, technology, and society.

Community Engagement:
Amrita Vishwa Vidyapeetham, Amritapuri Campus, actively engages with the local community through various outreach programs, social initiatives, and skill development projects. Through these endeavors, the campus endeavors to address societal challenges, promote sustainable development, and empower marginalized communities.
3. Quality Policy

At Amrita Vishwa Vidyapeetham, Amritapuri Campus, we are committed to maintaining the highest standards of quality in all aspects of our academic, research, and service endeavors. Our quality policy is rooted in the following principles:

Commitment to Excellence: We strive for excellence in everything we do, aiming to exceed the expectations of our stakeholders and contribute meaningfully to society. Our pursuit of excellence is reflected in the quality of our academic programs, research outcomes, infrastructure, and services. We are dedicated to:

Academic Excellence: Striving for academic rigor, innovation, and relevance in our curriculum design, pedagogical approaches, and assessment practices. We aim to nurture intellectual curiosity, critical thinking skills, and a passion for lifelong learning among our students.

Research Excellence: Pursuing cutting-edge research that addresses pressing societal challenges, advances knowledge frontiers, and contributes to global scientific and technological advancements. We promote interdisciplinary collaboration, research integrity, and impactful dissemination of research outcomes.

Infrastructure Excellence: Maintaining state-of-the-art infrastructure and facilities that support teaching, learning, research, and extracurricular activities. We invest in the continuous upgrading and expansion of our physical and technological infrastructure to provide a conducive environment for academic and research pursuits.

Service Excellence: Providing exemplary service to our stakeholders, including students, faculty, staff, and the broader community. We prioritize responsiveness, efficiency, and professionalism in delivering administrative, support, and outreach services, striving to exceed expectations and create positive experiences.

Continuous Improvement: We believe in fostering a culture of continuous improvement, where every member of our community is encouraged to identify areas for enhancement and implement proactive measures to address them. Through regular feedback mechanisms, data-driven decision-making, and benchmarking against best practices, we endeavor to constantly elevate our standards and performance. We are committed to:

Process Optimization: Regularly reviewing and refining our institutional processes and workflows to enhance efficiency, effectiveness, and responsiveness. We embrace lean principles and quality management methodologies to streamline operations and eliminate waste.

Performance Monitoring: Implementing robust monitoring and evaluation mechanisms to track key performance indicators, identify areas for improvement, and measure progress towards our strategic goals. We analyze data, solicit feedback, and conduct regular audits to inform decision-making and drive continuous improvement initiatives.
Professional Development: Investing in the professional development and capacity-building of our faculty, staff, and students. We provide opportunities for training, skill enhancement, and knowledge dissemination to empower individuals to contribute effectively to the institution's mission and objectives.

Innovation and Adaptation: Encouraging innovation, creativity, and adaptability in response to changing external environments, emerging trends, and evolving stakeholder needs. We foster a culture of experimentation, risk-taking, and learning from failures to drive innovation and foster resilience.

Stakeholder Satisfaction: We are dedicated to ensuring the satisfaction of all our stakeholders, including students, faculty, staff, alumni, industry partners, etc. By actively engaging with stakeholders, soliciting their input, and responding promptly to their needs and expectations, we seek to build trust, foster collaboration, and enhance overall satisfaction. We are committed to:

Student-Centric Approach: Placing students at the center of our academic programs and support services, prioritizing their holistic development, well-being, and success. We strive to create a nurturing, inclusive, and empowering learning environment that meets the diverse needs and aspirations of our students.

Engagement and Communication: Actively engaging with our stakeholders through transparent communication, meaningful dialogue, and collaborative decision-making processes. We solicit feedback, listen attentively to concerns, and respond promptly with improvements.

Partnership and Collaboration: Building strong partnerships and collaborative relationships with industry partners, alumni etc. We leverage synergies, share resources, and co-create value through mutually beneficial collaborations that enhance stakeholder satisfaction and contribute to shared goals.

Service Excellence: Providing exemplary service to our stakeholders, demonstrating responsiveness, professionalism, and a commitment to exceeding expectations. We prioritize stakeholder needs, anticipate emerging trends, and proactively innovate to deliver value-added services and solutions.

Adherence to Ethical Values: Integrity, transparency, and ethical conduct are fundamental to our quality policy. We uphold the highest standards of academic integrity, research ethics, and professional conduct, fostering an environment of trust, fairness, and respect for all members of our community.
4. Strategic Goals

Academic Excellence:
- Enhance the quality of academic programs through curriculum innovation, pedagogical advancements, and faculty development initiatives.
- Strengthen outcome-based education practices to ensure alignment with industry requirements and societal needs.
- Foster interdisciplinary learning and research collaborations to address complex challenges and foster holistic development.
- Implement measures to enhance the existing mechanisms for continuous assessment and feedback to maintain and improve academic standards.

Research and Innovation:
- Foster a culture of research and innovation across disciplines by providing infrastructure, funding, and institutional support.
- Encourage faculty and students to engage in cutting-edge research projects with societal relevance and global impact.
- Strengthen collaboration with industry partners, government agencies, and international institutions to address research challenges and opportunities.
- Facilitate technology transfer and commercialization of research outcomes to contribute to economic growth and societal well-being.
- Strengthen the startup policy and provide comprehensive support for the incubation, acceleration, and scaling of innovative ventures originating from academic research.
- Establish mechanisms to identify, protect, and commercialize intellectual property generated through research activities, fostering a culture of entrepreneurship and innovation among faculty and students.
- Promote interdisciplinary research initiatives that address complex societal challenges, such as healthcare, sustainability, and digital transformation, leveraging the collective expertise of multiple disciplines.
- Enhance research funding opportunities through strategic partnerships, grants, and industry-sponsored projects to support high-impact research endeavors and nurture emerging research areas.
- Foster a supportive ecosystem for research and innovation by establishing a dedicated research building with state-of-the-art facilities and resources tailored to the needs of researchers and innovators.
- Encourage participation in national and international research competitions, conferences, and exhibitions to showcase research achievements, build networks, and gain recognition on a global platform.
- Establish mechanisms for monitoring and evaluating the impact of research and innovation activities, including metrics such as publications, patents, technology transfers, and societal outcomes, to inform strategic decision-making and resource allocation.
**Focus Areas in Electronics & Communication Engineering:**

- Photonics and Optical Communications: Investigate novel techniques and devices for optical communication systems, photonics-based sensors, and applications in areas such as data transmission, imaging, and sensing.
- Networking and Communication: Explore emerging trends in networking technologies, such as device-to-device communication, software-defined networking (SDN), and network security to enhance connectivity and reliability in communication systems.

**Center of Excellence in Electromagnetics:**

- Radio Frequency (RF) and Microwave Engineering: Conduct research in RF and microwave components, antennas, and propagation phenomena to advance communication systems, radar systems, and remote sensing applications.
- Electromagnetic Compatibility (EMC): Investigate techniques for mitigating electromagnetic interference (EMI) and ensuring compatibility between electronic devices to enhance the reliability and performance of communication and electronic systems.
- Antenna Design and Optimization: Develop innovative antenna designs and optimization algorithms for various applications, including wireless communication, satellite communication, and radar systems.

**Center of Excellence in VLSI Design:**

- Analog and Mixed-Signal VLSI Design: Research in analog and mixed-signal circuit design, low-power design techniques, and optimization algorithms to develop energy-efficient integrated circuits for diverse applications.
- Digital VLSI Design: Investigate advanced digital design methodologies, high-speed interconnects, and system-on-chip (SoC) architectures to improve the performance and scalability of digital integrated circuits.
- Hardware Security: Explore techniques for ensuring the security and trustworthiness of VLSI designs, including side-channel attack mitigation, hardware obfuscation, and hardware Trojan detection and prevention.

**Center of Excellence in Communication and Signal Processing:**

- Digital Signal Processing (DSP): Conduct research in signal processing algorithms, adaptive filtering, and machine learning techniques for applications in communications, audio processing, image processing, and biomedical signal analysis.
- Wireless Communications: Investigate advanced modulation and coding schemes, channel estimation techniques, and resource allocation algorithms to improve the efficiency and reliability of wireless communication systems.
- Biomedical Signal Processing: Develop signal processing methods for analyzing and interpreting physiological signals, such as electrocardiograms (ECG), electroencephalograms (EEG), and medical imaging data, to aid in disease diagnosis and treatment.
Thrust Area Groups in Electrical & Electronics Engineering:

- Intelligent Electric Grids and eMobility: Research in smart grid technologies, electric vehicle (EV) integration, renewable energy systems, and energy management algorithms to enhance grid efficiency, reliability, and sustainability.
- AI in Power System Operation and Control: Investigate the application of artificial intelligence (AI) techniques, such as machine learning and optimization algorithms, for improving the operation and control of power systems, including microgrids, renewable energy integration, and demand response.
- Embedded Control and Automation: Research in embedded systems, control algorithms, and automation technologies for applications in robotics, industrial automation, smart manufacturing, and Internet of Things (IoT) devices to improve efficiency and productivity.

Focus Areas in Computer Science and Engineering:

- Artificial Intelligence (AI):

  Introduction of New Courses: launch new academic courses in AI, in UG level
  Research Center for AI: Establish a dedicated research center for AI to foster interdisciplinary research collaborations, facilitate technology transfer, and promote innovation in AI technologies. The center will serve as a hub for cutting-edge research projects, industry partnerships, and academic initiatives aimed at advancing the frontiers of AI.

  Cybersecurity:

  New Courses in Cybersecurity: Introduce specialized courses and training programs in cybersecurity, covering areas such as network security, cryptography, ethical hacking, and cyber defense technologies. These courses will prepare students to address the growing demand for cybersecurity professionals and contribute to securing digital infrastructure and assets.
  Enhanced Research Center: Strengthen the existing research center in cybersecurity by expanding its scope, resources, and collaborations.

- Wireless Networks & Applications:

  Advanced Courses in Wireless Networks: courses and workshops in wireless networks and applications, encompassing topics such as mobile computing, Internet of Things (IoT), and wireless sensor networks.

  Research Center Expansion: Expand the research center dedicated to Wireless Networks & Applications to accommodate growing research activities, attract top talent, and foster industry partnerships.

- Data Science: Introduce specialized courses and training programs in Data Science
Focus Areas in Mechanical Engineering

Advanced Manufacturing Technologies: Explore innovative manufacturing technologies such as additive manufacturing (3D printing), advanced materials processing, and digital manufacturing techniques. Investigate the integration of robotics, AI, and automation into the manufacturing workflow to optimize efficiency, flexibility, and sustainability.

Robotics and Artificial Intelligence: Introduce specialized courses and training programs in Robotics and Artificial Intelligence.

Material science and metallurgy: Establish a dedicated research laboratory facility and center for Advanced Materials, equipped with state-of-the-art equipment and resources. This facility will serve as a hub for interdisciplinary research in areas such as flexible and stretchable electronics, wearable devices, printed electronics, smart materials, and nanotechnology. The center will foster collaboration among researchers from various disciplines, facilitate technology transfer, and support industry partnerships to accelerate innovation in next-generation electronic devices and materials with applications in healthcare, energy, consumer electronics, and beyond.

Industry Collaboration:

- Forge strategic partnerships with industry leaders to promote knowledge exchange, technology transfer, and collaborative research.
- Align academic programs with industry needs through industry advisory boards, internships, and industry-sponsored projects.
- Establish centers of excellence and innovation hubs to address industry challenges and develop solutions through joint R&D efforts.
- Offer executive education programs, workshops, and seminars to upskill industry professionals and foster lifelong learning.
- Forge strategic partnerships and collaborations with leading industry players in sectors such as telecommunications, semiconductor manufacturing, electronics, and energy to foster innovation, knowledge exchange, and technology transfer.
- Establish joint research initiatives, consortia, and industry-academia forums to address industry challenges, co-develop cutting-edge technologies, and facilitate commercialization of research outcomes.
- Identify industry-relevant research priorities and align research proposals with industry needs and market demands to enhance the competitiveness and impact of sponsored projects.
- Leverage existing research expertise and infrastructure to attract funding from industry sponsors for projects ranging from proof-of-concept studies to large-scale research programs.
Student Development and Support:

- Provide comprehensive support services to foster the holistic development and well-being of students.
- Improve mentoring programs, career counseling, and leadership development initiatives to enhance student employability and success.
- Create opportunities for experiential learning, community engagement, and entrepreneurial ventures to nurture innovation and creativity.
- Promote diversity, inclusivity, and cultural exchange to cultivate global citizenship and empathy among students.

Infrastructure Enhancement:

- Invest in modernizing and expanding infrastructure facilities to meet the evolving needs of teaching, learning, and research.
- Upgrade laboratories, libraries, and IT infrastructure to support cutting-edge research and academic excellence.
- Develop state-of-the-art facilities for experiential learning, simulation, and prototyping to enhance hands-on learning experiences.
- Ensure sustainability and environmental stewardship in infrastructure development and operations.
- Provide access to advanced technological resources such as high-performance computing clusters, FPGA prototyping platforms, RF test equipment, and CAD tools for circuit design, simulation, and verification.
- Establish technology incubation centers and innovation hubs to nurture entrepreneurial talent and facilitate technology transfer from academia to industry.
- Invest in infrastructure improvements such as facility renovation, expansion of laboratory space, installation of advanced equipment, and deployment of modern IT infrastructure to enhance the overall research ecosystem.
- Prioritize sustainability and energy efficiency in infrastructure development by adopting green building practices, energy-efficient systems, and renewable energy technologies wherever feasible.
- Foster a supportive ecosystem for research and innovation by establishing a dedicated research building with state-of-the-art facilities and resources tailored to the needs of researchers and innovators.

Internationalization:

- Foster global collaborations, partnerships, and exchange programs to promote cross-cultural understanding and internationalization of the campus.
- Expand opportunities for international students and faculty exchanges, joint research projects, and dual-degree programs.
- Offer courses, seminars, and cultural events that showcase diverse perspectives and promote global citizenship.
- Facilitate international accreditation, recognition, and benchmarking to enhance the global reputation and competitiveness of the institution.
5. Academic Plan

**Strengthening Faculty Development:**
- Enhance current faculty development initiatives with a focus on improving teaching effectiveness, research competencies, and leadership capabilities.
- Provide more opportunities for faculty members to attend workshops, conferences, and training sessions both nationally and internationally to stay updated with the latest trends and developments in their respective fields.
- Encourage faculty members to pursue higher education, certifications, and professional development courses to deepen their expertise and contribute to academic excellence.
- Establish mentoring programs where senior faculty members mentor junior faculty, providing guidance and support in areas such as research, teaching, etc.

**Enhancing Teaching and Learning:**
- Invest in technology-driven infrastructure to facilitate modern teaching and learning methodologies, including smart classrooms, virtual labs, and e-learning platforms.
- Encourage faculty members to adopt innovative teaching pedagogies such as flipped classrooms, problem-based learning, and experiential learning approaches to engage students and promote active learning.
- Provide resources and support for the development of high-quality instructional materials, including textbooks, lecture notes, multimedia presentations, and online resources.
- Implement periodic faculty training sessions on effective teaching practices, assessment methods, and student engagement strategies to improve overall teaching quality and student learning outcomes.

**Developing Academic Programs:**
- Conduct regular reviews and updates of academic programs to ensure relevance, alignment with industry needs, and adherence to global standards.
- Introduce new academic programs and specializations in emerging fields to cater to evolving market demands and technological advancements. This includes the development of flexible learning pathways, such as online courses, to accommodate the needs of working professionals.
- Collaborate with industry partners and academic experts to design curriculum frameworks that integrate theoretical knowledge with practical skills and real-world applications, ensuring that the programs meet the evolving needs of the industry and prepare students for successful careers.
- Establish interdisciplinary academic programs and research initiatives that bridge multiple disciplines to address complex societal challenges and foster innovation. This includes offering interdisciplinary courses and research opportunities that encourage collaboration across departments and fields of study.
- Develop customized courses and training programs specifically tailored to the needs of working professionals, providing opportunities for upskilling, reskilling, and lifelong learning.
- Implement industry-aligned certification programs and professional development courses that equip students and professionals with the skills and knowledge needed to
excel in their respective fields. These programs may be developed in collaboration with industry partners and professional organizations to ensure their relevance and value in the job market.

- Foster a culture of continuous learning and professional growth among faculty, staff, and students, encouraging participation in workshops, seminars, and continuing education programs to stay updated on the latest trends, technologies, and best practices in their respective fields.

**Improving Quality of Student Life:**

- Enhance student support services such as counseling, career guidance, and academic advising to address the holistic needs of students and promote their overall well-being.
- Implement measures to improve campus infrastructure and facilities, including student accommodations, recreational areas, and dining facilities, to create a conducive environment for learning and living.
- Promote extracurricular activities, sports events, cultural festivals, and community engagement initiatives to foster social interaction, personal development, and a sense of belonging among students.
- Improve the mechanisms for feedback and grievance redressal to address student concerns and ensure a positive and inclusive campus experience for all students.
- Conduct regular advising sessions to monitor academic progress, identify challenges, and develop strategies for academic success, including study skills development and time management techniques.
- Strengthen career counseling services to help students explore career pathways, set career goals, and develop employability skills necessary for their chosen professions.
- Strengthen the mechanism of guidance on resume writing, interview preparation, and job search strategies, including internship and co-op opportunities, industry placements, and job shadowing experiences.
- Foster a vibrant campus community by supporting a diverse range of student clubs.

6. **Quality Assurance and Accreditation**

Quality assurance and accreditation play pivotal roles in ensuring the delivery of high-quality education, promoting institutional excellence, and safeguarding the interests of students and other stakeholders. By upholding rigorous standards of quality and accountability, accredited institutions contribute to the advancement of knowledge, the enhancement of societal well-being, and the preparation of future generations of leaders and professionals. Quality assurance involves the systematic implementation of policies, procedures, and practices aimed at ensuring that educational programs meet established standards of quality and effectiveness. It encompasses various aspects of institutional operations, including curriculum development, teaching and learning methodologies, faculty qualifications, student support services, infrastructure facilities, research endeavors, and governance structures. The accreditation process typically involves a thorough review of institutional policies, practices, and outcomes by external evaluators, who assess factors such as curriculum relevance, faculty credentials, student learning outcomes, infrastructure adequacy, financial stability, and governance effectiveness.
Compliance with Accreditation Standards: Our institution is dedicated to ensuring that all academic programs and institutional practices align seamlessly with the accreditation standards established by relevant regulatory bodies. This commitment involves conducting regular and comprehensive reviews and assessments to verify adherence to accreditation criteria encompassing various facets of academic and administrative operations. These accreditation standards encompass essential aspects such as curriculum quality, faculty qualifications, adequacy of infrastructure, effectiveness of student support services, and the overall governance framework of the institution. Through meticulous monitoring and evaluation, we strive to maintain alignment with these standards, thereby upholding the highest levels of academic excellence and institutional integrity.

As part of our strategic objectives, we aim to excel in accreditation assessments conducted by prominent bodies such as the National Assessment and Accreditation Council (NAAC) and other national and international survey agencies. Our goal is to achieve top-tier rankings in accreditation evaluations, positioning our institution as a leader in higher education quality assurance.

In line with this commitment, we aspire to obtain accreditation from the National Board of Accreditation (NBA) for a minimum of 50% of our undergraduate programs in the initial phase. Subsequently, we aim to extend this accreditation coverage to encompass 100% of both undergraduate and postgraduate programs in subsequent phases.

By prioritizing compliance with accreditation standards and actively pursuing accreditation from esteemed bodies, we demonstrate our unwavering dedication to delivering excellence in education, fostering continuous improvement, and ensuring the holistic development of our institution and its stakeholders.

Continuous Monitoring and Evaluation: We are committed to implementing a robust and systematic process of continuous monitoring and evaluation to ensure the ongoing effectiveness of our academic programs, teaching methodologies, and support services. This comprehensive approach involves the collection, analysis, and interpretation of data on diverse performance indicators to gauge various aspects of our educational ecosystem.

Our monitoring and evaluation framework encompasses key metrics such as student learning outcomes, faculty productivity, research outputs, student satisfaction levels, and feedback from employers. By regularly assessing these indicators, we gain valuable insights into the strengths and areas for improvement across our institution.

To facilitate this process, we have established the Amrita Center for Accreditations Ranking and Eminence (ACARE) team, comprising dedicated professionals tasked with overseeing the monitoring and evaluation activities. Additionally, our Internal Quality Assurance Cell (IQAC) committee plays a pivotal role in coordinating and streamlining evaluation efforts across departments and disciplines.

Through continuous monitoring and evaluation, we aim to foster a culture of accountability, transparency, and data-driven decision-making within our institution. By leveraging insights gleaned from these assessments, we can identify emerging trends, address challenges
proactively, and optimize resource allocation to enhance the quality and relevance of our educational offerings.

By harnessing the collective expertise of our faculty, staff, and stakeholders, we are poised to implement a continuous improvement cycle that ensures the ongoing alignment of our programs and services with the evolving needs of our students and the broader community.

**Feedback Mechanisms:** We are committed to enhancing our existing feedback mechanisms to ensure comprehensive input from all stakeholders, including students, faculty, alumni, employers, and external experts. By leveraging a variety of channels such as surveys, focus group discussions, suggestion boxes, and online feedback platforms, we aim to solicit diverse perspectives on various aspects of our institution. The feedback collected from stakeholders serves as a valuable source of insight into the strengths, weaknesses, and areas for improvement across different facets of our institution. This data enables us to proactively address concerns and implement measures to enhance overall quality.

Moreover, our feedback mechanisms facilitate transparency, accountability, and continuous dialogue between the institution and its stakeholders. By fostering an environment of open communication and collaboration, we aim to cultivate a culture of continuous improvement and excellence.

To streamline this process, we collaborate closely with the Amrita Center for Accreditations Ranking and Eminence (ACARE) and our Internal Quality Assurance Cell (IQAC) team. These dedicated entities play a vital role in evaluating and analyzing feedback data to inform strategic decision-making and drive initiatives aimed at furthering the quality and relevance of our educational offerings.

### 7. Conclusion

In conclusion, our strategic plan embodies a comprehensive roadmap aimed at fostering holistic development, innovation, and excellence at Amrita Vishwa Vidyapeetham, Amritapuri Campus. Through concerted efforts across various domains, we are committed to realizing our vision of becoming a globally recognized center of academic and research excellence.

**Recap of Strategic Goals:**

Our strategic goals encompass a wide range of initiatives focused on academic excellence, research and innovation, industry collaboration, student development and support, infrastructure enhancement, and internationalization. By aligning our efforts with these overarching objectives, we aim to create a vibrant and conducive environment for learning, research, and professional growth.

**Academic Excellence:**

- Implement rigorous academic standards and innovative teaching methodologies to enhance learning outcomes.
- Regularly review and update curriculum to ensure alignment with industry trends and global standards.
• Foster a culture of intellectual curiosity and critical thinking among students and faculty members.
• Provide opportunities for interdisciplinary learning and research to address complex challenges.

Research and Innovation:
• Establish research centers of excellence focused on key areas of societal relevance and technological advancement.
• Encourage faculty and students to engage in cutting-edge research projects with practical applications.
• Strengthen collaboration with industry partners, government agencies, and international institutions to foster innovation.
• Facilitate technology transfer and commercialization of research outcomes to drive economic growth and societal impact.

Industry Collaboration:
• Forge strategic partnerships with industry leaders to facilitate knowledge exchange, research collaboration, and technology transfer.
• Undertake sponsored research projects to address industry challenges and develop innovative solutions.
• Provide internship and co-op opportunities for students to gain real-world experience and industry exposure.
• Collaborate with industry experts to design curriculum frameworks that align with industry needs and promote skill development.

Student Development and Support:
• Strengthen comprehensive support services such as academic advising, career counseling, and personal development programs.
• Foster a supportive and inclusive campus environment that promotes student engagement and well-being.
• Provide opportunities for extracurricular activities, leadership development, and community service.
• Improve mentorship programs and peer support networks to enhance student success and retention.

Infrastructure Enhancement:
• Invest in state-of-the-art facilities, laboratories, and technological resources to support teaching, learning, and research.
• Upgrade campus infrastructure to meet the evolving needs of students, faculty, and staff.
• Ensure accessibility and sustainability in infrastructure development initiatives.
• Implement smart technologies and digital platforms to enhance campus efficiency and connectivity.
Internationalization:

- Foster global partnerships and collaborations with leading universities and research institutions worldwide.
- Promote student and faculty exchange programs to facilitate cross-cultural learning and collaboration.
- Host international conferences, seminars, and workshops to promote knowledge sharing and networking.
- Offer globally relevant academic programs and certifications to attract international students and faculty.

Future Outlook:

Looking ahead, we are optimistic about the future of Amrita Vishwa Vidyapeetham, Amritapuri Campus. We envision a future characterized by continued growth, innovation, and global impact. By leveraging emerging technologies, nurturing talent, and forging strategic partnerships, we aim to position ourselves as a leader in education, research, and societal transformation. With a steadfast focus on our core values and a spirit of resilience and adaptability, we are poised to overcome challenges and seize opportunities in the dynamic landscape of higher education.
Appendices

1. SWOT analysis

**Strengths**
- Commitment to Excellence
- Quality Policy
- Infrastructure
- Research and Innovation
- Industry Collaboration
- Student Development

**Weaknesses**
- Accreditation Coverage
- Feedback Mechanisms

**Opportunities**
- Emerging Technologies
- Internationalization
- Industry Partnerships
- Interdisciplinary Research

**Threats**
- Competitive Landscape
Strengths:

- Commitment to Excellence: The institution demonstrates a strong commitment to academic, research, and service excellence, reflected in its policies, programs, and initiatives.
- Quality Policy: The institution's quality policy emphasizes academic rigor, research integrity, service excellence, and continuous improvement, providing a robust framework for maintaining high standards.
- Infrastructure: Campus boasts state-of-the-art infrastructure and facilities supporting teaching, research, and extracurricular activities, contributing to a conducive learning environment.
- Research and Innovation: The institution fosters a culture of research and innovation, promoting interdisciplinary collaboration, technology transfer, and entrepreneurship.
- Industry Collaboration: Strong partnerships with industry leaders facilitate knowledge exchange, collaborative research, technology transfer, and skill development, enhancing the relevance and impact of academic programs.
- Student Development: Comprehensive support services, extracurricular activities, and career guidance initiatives promote holistic student development, fostering personal growth, employability, and success.

Weaknesses:

- Accreditation Coverage: While the institution aims for accreditation, there may be challenges in achieving coverage for all programs
- Feedback Mechanisms: Despite efforts to enhance feedback mechanisms, there may be gaps in capturing comprehensive input from stakeholders

Opportunities:

- Emerging Technologies: Leveraging emerging technologies such as AI, IoT, and data science presents opportunities for enhancing teaching, research, and infrastructure capabilities.
- Internationalization: Expanding global collaborations, exchange programs, and international accreditation can enhance the institution's reputation, attract diverse talent, and foster cross-cultural learning.
- Industry Partnerships: Deepening collaborations with industry partners can lead to joint research projects, sponsored initiatives, internship opportunities, and curriculum alignment, enhancing the relevance and employability of graduates.
- Interdisciplinary Research: Investing in interdisciplinary research initiatives to address societal challenges presents opportunities for innovation, funding, and collaboration across diverse fields.
Threats:

- Competitive Landscape: Intense competition from other institutions, both nationally and internationally, poses to attracting top talent, securing funding, and maintaining academic and research excellence. But it also presents an opportunity for our institution to showcase its strengths, innovation, and adaptability. By leveraging our unique offerings, fostering strategic partnerships, and nurturing a culture of excellence, we are well-positioned to not only attract top talent and secure funding but also to emerge as a leader in academic and research endeavors on a global scale.
Implementation of Strategic Plan (2020-2024)

Introduction:

In line with our strategic vision and commitment to excellence, we are pleased to present the implementation details of the key initiatives outlined in our previous strategic plan. Over the past years, our institution has undergone a transformative journey, marked by significant strides in academic innovation, research excellence, and global engagement. We have introduced several new academic programs tailored to meet the evolving demands of the industry and society, including M.Tech. Computer Science and Engineering (Artificial Intelligence and Machine Learning), B.Tech. Automation and Robotics, and M.Tech. Mechatronics, among others. These programs not only reflect our responsiveness to emerging trends but also underscore our dedication to equipping students with the skills and knowledge needed to thrive in an increasingly complex and interconnected world. Furthermore, our commitment to fostering interdisciplinary collaboration has led to the establishment of new research centers, these centers serve as hubs for cutting-edge research and innovation. Additionally, we have embraced blended learning methodologies and invested in technology-driven infrastructure to enhance the teaching and learning experience.

Key Initiatives Implemented:

➢ Introduction of New Academic Programs:

In alignment with our strategic goal of enhancing academic excellence and meeting emerging industry demands, we have introduced six new academic programs that cater to the evolving needs of the technological landscape. These programs have been carefully designed to foster interdisciplinary learning, innovation, and real-world application, in line with our commitment to providing students with the knowledge and skills necessary to excel in their chosen fields.


This program focuses on the rapidly evolving fields of artificial intelligence (AI) and machine learning (ML), preparing students to develop intelligent systems, algorithms, and applications that can learn from and adapt to data. Through a combination of theoretical coursework, hands-on projects, and research opportunities, students will gain expertise in cutting-edge AI and ML techniques and their applications in various domains such as healthcare, finance, and autonomous systems.

2. B.Tech. Automation and Robotics:

The Bachelor of Technology in Automation and Robotics program is designed to equip students with the knowledge and skills required to design, develop, and deploy automated systems and robotic technologies. With a curriculum that integrates principles from mechanical engineering,
electrical engineering, and computer science, students will learn to create innovative solutions for industrial automation and more.

3. **M.Tech. Mechatronics:**

Mechatronics, the synergy of mechanical engineering, electronics, and computer science, is at the forefront of modern engineering innovation. Our Master of Technology in Mechatronics program provides students with a comprehensive understanding of integrated systems, intelligent control, and advanced automation technologies. Graduates will be well-equipped to design and optimize complex mechatronic systems for a wide range of applications, including robotics, automotive systems, and smart manufacturing.

4. **B.Tech. Artificial Intelligence (AI) and Data Science:**

The Bachelor of Technology in Artificial Intelligence (AI) and Data Science program is designed to meet the growing demand for professionals skilled in AI, data analytics, and machine learning. Students will learn to harness the power of data to derive insights, make predictions, and drive decision-making in various domains. With a strong emphasis on hands-on learning and real-world projects, graduates will be prepared for careers in data-driven industries such as finance, healthcare, and e-commerce.

5. **B.Tech. Computer Science and Engineering (Cyber Security):**

In today's interconnected world, cybersecurity has become a critical concern for organizations across industries. Our Bachelor of Technology in Computer Science and Engineering with a specialization in Cyber Security equips students with the knowledge and skills to protect digital assets, secure networks, and mitigate cyber threats. Through a combination of theoretical coursework, practical exercises, and industry collaborations, students will learn to develop robust security solutions to safeguard information and systems.

6. **B.Tech. Robotics and Artificial Intelligence:**

Robotics and artificial intelligence (AI) are revolutionizing industries ranging from manufacturing to healthcare. Our Bachelor of Technology in Robotics and Artificial Intelligence program offers students a unique opportunity to explore the intersection of robotics and AI, preparing them to design and deploy intelligent robotic systems for diverse applications. With a focus on hands-on learning and experiential projects, students will develop the technical and creative skills needed to drive innovation in this rapidly evolving field.
New Research Centers and Infrastructure Development:

To facilitate interdisciplinary research and foster innovation, we have established new centers of excellence focused on key areas of societal relevance and technological advancement. These centers serve as hubs for cutting-edge research projects, industry collaborations, and academic initiatives aimed at addressing complex challenges.

1. Amrita Coconut Research and Development Center (ACORD):

ACORD is dedicated to revolutionizing coconut harvesting through the development of intelligent robots and AI solutions. Led by Dr. Rajesh Kannan Megalingam, the center's team leverages cutting-edge research and modern facilities to innovate farming practices. Collaborating with farmers and industry partners, ACORD aims to empower communities and nurture a sustainable future.

2. Amrita Mind Brain Center:

The Amrita Mind Brain Center conducts interdisciplinary research on brain and mind organization and function. Collaborating across various disciplines, including Medicine, Engineering, Biotechnology, Ayurveda, and Spiritual Studies, researchers employ experimental methods and computational neuroscience to understand consciousness and neurological disorders. Their work ranges from brain-computer interfaces to the effects of yoga on brain function, contributing to global initiatives.

3. Centre for Internet Studies and Artificial Intelligence (CISAI):

CISAI conducts interdisciplinary research and studies on the Internet, AI, and related technologies impact on society. With a focus on understanding the Internet's role across various domains, including business, communication, politics, and healthcare, CISAI collaborates with researchers, policymakers, students, and industry professionals. Through seminars, talks, conferences, and workshops, the center aims to deepen understanding and foster dialogue on internet-related issues.

4. Centre for Flexible Electronics and Advanced Materials:

This center focuses on research and development in flexible electronics and advanced materials. By exploring innovative materials and fabrication techniques, the center aims to advance technologies such as flexible displays, wearable electronics, and energy storage devices. Collaborations with industry partners and academic institutions drive research toward practical applications, contributing to advancements in electronics and materials science.
Infrastructure Development:
In addition to the establishment of new research centers, we have initiated the construction of a dedicated research building to further facilitate innovative research endeavors. The foundation stone has been laid, and work has commenced on creating state-of-the-art facilities to support cutting-edge research in various fields. This new infrastructure will provide researchers with the necessary resources and environment to conduct groundbreaking studies and contribute to global knowledge and innovation.

Achievement of Research Publication Goals:
As part of our commitment to research excellence, we have achieved our research publication goals, with several research papers published in reputed international and national journals. These publications reflect the quality and impact of our research efforts, contributing to the advancement of knowledge and the dissemination of innovative ideas in various domains. We commend our faculty and researchers for their dedication and contributions to scholarly discourse, and we look forward to further expanding our research footprint in the years to come.

➢ Implementation of Blended Learning
Recognizing the importance of leveraging technology to enhance teaching and learning outcomes, we have implemented blended learning methodologies across various academic programs. Blended learning combines traditional classroom instruction with online resources and interactive activities to promote active engagement and personalized learning experiences for students.

➢ Strengthening the Startup Ecosystem
We have successfully fortified our startup policy and provided comprehensive support for the incubation, acceleration, and scaling of innovative ventures originating from academic research. This initiative has led to the establishment of several startups, each contributing to the innovation ecosystem with groundbreaking solutions and disruptive technologies. By fostering a culture of entrepreneurship and providing vital resources and mentorship, we have empowered aspiring entrepreneurs to translate their ideas into viable businesses, driving economic growth and societal impact.

➢ Fostering Innovation and Entrepreneurship
With the presence of a dedicated patent officer on campus and the establishment of the Institutions Innovation Council, we have created robust frameworks to support the identification, protection, and commercialization of intellectual property. These initiatives have empowered our academic community to transform innovative ideas into tangible products and services.
Next Steps:

- Finalize action plans for each strategic initiative, outlining specific tasks, timelines, and responsible parties.
- Monitor progress regularly and make adjustments as needed to ensure the successful execution of strategic initiatives.
- Continuously evaluate and refine implementation strategies to adapt to evolving needs and circumstances, ensuring the ongoing alignment of our efforts with organizational goals and objectives.

Conclusion

In conclusion, the implementation of our strategic plan marks a significant milestone in our journey towards academic excellence, research innovation, and societal impact. Through the introduction of new academic programs and the establishment of cutting-edge research centers, we have demonstrated our commitment to meeting the evolving needs of the industry and society while fostering interdisciplinary collaboration and innovation. Our investment in technology-driven infrastructure and blended learning methodologies further underscores our dedication to providing students with a dynamic and immersive learning experience that prepares them for success in the digital age. Moreover, our achievement of research publication goals, with several papers published in esteemed international and national journals, underscores the quality and impact of our scholarly endeavors.

Looking ahead, we remain steadfast in our commitment to continuous improvement and innovation. By finalizing action plans for each strategic initiative and closely monitoring progress, we will ensure the successful execution of our objectives while remaining agile and responsive to changing circumstances. Through ongoing evaluation and refinement of our implementation strategies, we will continue to adapt and innovate, ensuring that our efforts remain aligned with our organizational goals and objectives. Together, we are poised to achieve new heights of excellence and make a lasting impact on our students, our community, and the world at large.
Strategic Planning

The department proposes starting Centers of Excellence in certain key areas of national and international significance in order to promote advanced research and engineering capabilities among faculty and students in these key areas. Through the establishment of these Centers, the department aims to be both nationally and internationally renowned in research in these areas.

Proposed Centers of Excellences

2. Center of Excellence in High Assurance Systems: CHS
3. Center of Excellence in Artificial Intelligence and Data Science: CAD
4. Center of Excellence in Computational Life Sciences: CCL

1. Center of Excellence in Image Processing & Machine Vision

Summary

Surveillance of high security areas is a critical area. Video monitoring and summarization have been recognized as the best way to achieve the same. Road traffic safety has been seriously looked into and automatic detection of driver inattention is a critical area of research that can save many lives. Intelligent transportation systems, is the emerging area that seeks to automate driving and transportation, image processing assists in the recognition and localization of vehicles. In medicine, advanced techniques to process images are known to assist in improved and faster medical diagnosis. This center seeks to meet the growing needs of video processing in surveillance and summarization, image/video processing in intelligent transportation systems and smart environments, and image processing in medical diagnostics.

Thrust research areas

(a) Video summarization.
(b) Medical image processing for assistive diagnostics.
(c) Inattention detection systems.
(d) Examination surveillance systems.
(e) Smart Environments
(O Intelligent Transportation Systems.

Short term goals (1-5 years).

- Perform cutting edge research areas are Video summarization, Medical image processing for assistive diagnostics, Inattention detection systems, Smart environments, Examination surveillance systems, Intelligent Transportation Systems, as well as Machine learning/pattern recognition in images/videos.

- Develop competence of students and faculty in the respective areas.

- Apply for grants in these areas from DST, DRDO and other reputed funding agencies. Establish strong national collaborations.
Research infrastructure/Lab Equipment: High performance computing facility, Video capture devices, storage devices.

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Non-Recurring – additional breakdown:

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<td>3 AXIS M5013</td>
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<tr>
<td>4 16 Tera bytes Hard</td>
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</tr>
<tr>
<td>5 LCD Display</td>
<td>15</td>
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- Establish strong international collaborations.
- Publish articles in SCOPUS indexed international conferences and journals.
- Produce high quality graduates with Masters and PhD degrees in these areas.
- Organize workshops to train students and faculties across the globe.
- Host reputed international conferences in these areas.
- Procure required equipment from abroad if such equipment is unavailable in India.
- Hire high calibre research faculty of international repute.

**Long term goals (10-15 years).**

- Identify the emerging trends in these areas.
- Lead the research in the emerging directions of these areas.

**Infrastructure CHS – ASE, AMR**


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|                         |               |              |              |
|                         | Rs. In Lakhs  | Rs. In Lakhs | Rs. In Lakhs |
| RECURRING               |               |              |              |
| Faculty Salaries        | 90            | 100          | 120          |
| PhD Scholarships        | 60            | 80           | 90           |
| Consumables             | 10            | 10           | 10           |
| Maintenance             | 5             | 5            | 10           |
| TOTAL                   | 165           | 195          | 230          |
| G. TOTAL                | 215           | 250          | 285          |
Medium term goals (5-10 years).

- Perform cutting edge research areas in the thrust areas of AI and Data Science
- Application domains include energy, healthcare, manufacturing, transportation and vehicular systems, financial services, retail, sports, telecom, smart cities, and IoT.
- Help students and faculty gain expertise in the respective areas.
- Apply for grants in these areas from DST, MeITY, DRDO, ISRO and other reputed funding agencies.
- Collaborate with industry to solve practical problems.
- Establish strong international collaborations.
- Publish articles in SCOPUS indexed international conferences and journals.
- Produce high quality graduates with Masters and PhD degrees in these areas.
- Organize workshops to train students and faculties across the globe.
- Host reputed international conferences in these areas.
- Procure required equipment from abroad if such equipment is unavailable in India.
- Hire high calibre research faculty of international repute.

Long term goals (10-15 years).

- Lead the research in the emerging directions of these areas.
- Advancing theory and algorithms for better understanding of big data

Infrastructure CAD – ASE, AMR

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Thrust Areas:

1. Prototypes of context focused **High Performance Machines**, supported by targeted algorithm development and development of API access for the same.
   Bioinformatics areas:
   a. Sequence assembly
   b. Sequence alignment
   c. Molecular dynamics
   d. Massive throughput docking (~)

2. Scientific computing software pipeline development for multiple TYPES of **sequencing projects (multi-omics)**, including Big Data tech development for the following main areas. Omic Areas (prominent examples)
   a. RNA-seq, DNA-seq, WGS, Exome-seq, and others.
   b. SNP detection, evaluation and prediction
   c. Annotation using big data based database integration
   d. Pharmacogenomics
   e. Gene panel development (towards prototyping and validation)
   f. India-centric personalized medicine based AI applications for currently available cloud platforms like IBM Watson

3. **Computational drug discovery** using deep learning and AI with a strong focus on search and optimization techniques.
   Drug discovery areas:
   - Hybrid sequence-structure search for druggable protein binding sites
     a. Peptide-based drug discovery with simulation and modeling workflows enabled by deep precision
     b. Massive semantic integration of drug, bioinformatics and bio-medical databases with an aim to create an extensible drug repurposing hyper-layer

Short term goals (1-5 years, for each thrust area)

1. **High performance machines**: Build high performance prototype machines is each of these sub-thrust areas through custom optimization of both hardware and software: sequence alignment, assembly and annotation pipelines AND 3D molecular dynamics simulations using HPC tech (Example ANTON)

2. **Sequencing technology software development**: Software and pipeline development for massively parallel sequencing technologies

3. **Computational drug discovery**: Customized development of deep learning and AI tools to support drug discovery pipelines

Medium term goals (5-10 years, for each thrust area)

1. **High performance machines**: Various biotech companies and large research groups will be sought to be beta testers of the technology developed and long term partners for product development.

2. **Sequencing technology software development**: Large sequencing centers often require individualized support of various omic projects. As a validation and to expand collaborations for the centers, various national and international genomic centers will be contacted.

3. **Computational drug discovery**: Prediction platforms to test various hypotheses will be validated using chemical and biological experiments.
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<td>830</td>
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</table>
MALE RESIDENTIAL ZONE

EXISTING
2,78,000 SQFT
1623 Occupants

PROPOSED
4,17,000 SQFT
1634 Occupants

UTILITIES AND AMENITIES
Cafeteria, Gym, Salon
Water Treatment Plant, Sewage Treatment Plant
FEMALE RESIDENTIAL ZONE

EXISTING
2,12,000 SQFT
1420 Occupants

PROPOSED
2,73,000 SQFT
978 Occupants

UTILITIES AND AMENITIES
Cafeteria, Gym, Salon
1. ENGINEERING ANNEX
Classrooms, Laboratories & Seminar halls

2. Administrative Block and Central Library
Lecture halls, Conference rooms, Auditorium, Exhibition halls, classrooms, office rooms and cafeteria

3. Multi Purpose hall
Mess hall, Indoor auditorium and indoor sports arena

4. Central kitchen
SPORTS ZONE

Volley Ball Court, Basket Ball Court, Football Ground, Badminton Court, Swimming Pool Complex etc.

Residential Buildings

1. International Students Hostel
   294 Occupants

2. Staff Quarters
   120 Occupants

3. Studio Apartments
   54Occupants