



Caledonian College of Engineering
Muscat, Sultanate of Oman
(University College)

STRATEGIC
RESEARCH
PLAN 2015-20

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1. INTRODUCTION

The Caledonian College of Engineering, Oman, a premier University College, started in 1996, promotes qualitative improvement in technical education and recognizes the role and importance of research as being one of the key elements for creating new knowledge and insight, and imparting excitement and dynamism to the educational process.

CCE has been very successful in promoting applied research in the key areas of research in waste management and alternate energy. CCE had a success of research in the area of Wastewater treatment, desalination, nanotechnology and waste management.

CCE is committed to innovative, technology driven research and research training to underpin the most effective teaching and learning strategies for the delivery of engineering and educational programmes. The College is fully aware of the need and requirement of extending the research activities in order to enhance academic development and health of the programmes. CCEO encourages the research and scholarly activities of the staff members and supports such activities financially, where appropriate. CCEO is trying to fulfil a significant educative function that includes planning and organizing a variety of research development initiatives to enhance the research endeavours of academic staff in consultation with departments. Emphasis is given to link College based researchers with industry partners to undertake innovative, industry-driven funded research. Research strategies of the College reinforce the provision of overall responsibility for policy and strategy development and advice, management and administration, as well as monitoring and reporting of research activities within the College.

2. RESEARCH STRATEGY

Caledonian College of Engineering (CCE) has always given due importance to foster applied and strategic research realising major goals of the college. The research strategies of the college emerge as one of the important functions along with effective learning and teaching process. The objective of the research strategies is to create and update the research capabilities of the faculty members of the college. The college continues to play an important role in the region promoting higher education for growth of human and intellectual diversity in the research enterprise with diverse and global perspectives

The research strategies of the College emerge as one of the important functions along with effective learning and teaching processes. The objective of the research strategies is to create and update the research capabilities of the faculty members of the College. CCEO has a strategy of staff development by encouraging the staff to engage in research and propagate the output of research through quality publications, and participation in conferences /seminars and workshops. Further, the College expects and encourages the faculty to - enhance their expertise and qualifications, attend short term courses and technical talks, develop regular interaction with technical experts of other institutions and industries.

The Research Plan expresses CCE's core commitments to ideas, innovation, sustainability, collaboration and partnership, and social engagement in research. Furthermore, under the banner of

nation's direction for research development capabilities and as a result of competency to addressing major societal challenges, areas of Research have been identified:

- To nourish and ensure capacity building in terms of expertise and infrastructural facilities
- To promote education, training and awareness through research programs
- To strengthen research and development and innovation support
- To foster and promote innovative and environment friendly technology for economic and social benefits
- To associate with industries, government and partners to establish sustainable research in the country

3. VISION, MISSION & VALUES OF CCE

Vision	To be a regional leader in developing creative and entrepreneurial engineers and a referral centre for innovative solutions	
Mission	Transforming students into responsible citizens and change agents	
Values	Excellence	Striving towards excellence through teamwork and sustained effort
	Integrity	Behaving with transparency and the highest moral standards in all aspects of work
	Leadership	Instilling in students the ethical and leadership qualities to transform society
	Innovation	Embracing and encouraging new knowledge, research, and entrepreneurialism
	Social Responsibility	Understanding the physical, cultural and social environment in which we operate, and respecting the rights and needs of all

4. RESEARCH MISSION, VISION AND GOALS

Mission: To foster pertinent research in scientific and technical disciplines and to excel in research and creative activities that develops knowledge and contributes to the economic growth and social advancement of the region.

Vision: To be a referral centre for innovative solutions through excellence in research and development

Goal 1	Establish research partnership with an International organisations of high standing in research
Goal 2	Generate new knowledge by engaging in cutting-edge research and develop infrastructure to conduct research in the relevant areas
Goal 3	Establish Centre of excellence in renewable energy, water and waste management, encompassing applied research and areas of strategic importance

Goal4	Undertake collaborative projects which offer opportunities for long-term interaction with academia and industry.
Goal5	Capacity development in strategic areas of research through development and training
Goal 6	Develop Master and PhD courses in the area of national importance

5. STRATEGIC OBJECTIVES

1. Generate new knowledge by engaging in cutting-edge research\
2. Undertake collaborative projects which offer opportunities for long-term interaction with academia and industry.
3. Develop infrastructural facilities and capacity to excel in research and creative activities
4. Explore research and consultancy funding from external funding agencies
5. Develop and implement graduate programs through Master and PhD
6. Implement plans for financial sustainability of the research program

CCE is ambitious that new Strategic Research Plan will support and furthers research excellence. It reinforces the aspirations of individual researchers as well as teams by providing broad direction, especially within areas of interest to the nation building. Continual reflection, appraisal, and strategic reinvestment will help us nurture a dynamic research environment that explores new ideas, contributes to the advancement of education, and mobilizes knowledge with our partners for the benefit of society. Proposal in each area of thrust will be developed in consultation with the core group and applied for funding, keeping the overall thematic interest of CCE and areas of interest to nation.

6. CORE COMMITMENTS

The following five core commitments illustrate CCE dedication to the pursuit of research excellence. At CCE we believe that fundamental research extends the boundaries of knowledge so it can inform and, in turn, support thematic and problem-based interdisciplinary research, while remaining responsive to new challenges as they emerge. There is no single metric that effectively measures the success of research and its impact on society more broadly. CCE recognize that all forms of research outputs affect society, directly or indirectly by underpinning the advancement of knowledge, and can be expressed as social, economic, environmental, or cultural benefits.

6.1 Ideas

Wherever research may ultimately lead, all advancements begin with ideas. Leading minds are free to pursue both curiosity-driven and solution-based research to address government, industry, and other imperatives. By asking questions – fundamental and applied research.

6.2 Innovation

Innovation in all its forms, social, pedagogical, and organizational, through the development of new technologies. Innovative ideas initiated at the college level, Caledonian Centre for creativity and innovation– allows playing a leading role molding innovative research. We invent and implement best practices in teaching and training and increase the impact of research by translating the results into social and commercial applications.

6.3 Sustainability

Sustainability is an important component in research at CCE. Researchers and students study all aspects of sustainability, taking a comprehensive approach to how they carry out their work. Sustainability is also an essential element of what CCE does to ensure the long-term viability of its research enterprise through maintaining and renewing its infrastructure and core facilities. CCE also play an important role in developing faculty, staff, students, and administrators who consider the environmental, social, and economic contexts and consequences of their work.

6.4 Collaboration and Partnership

CCE encourages and support productive and equitable research partnerships across academic and research fields It involves governmental agencies and its decision makers, local community organizations, citizens association, as well as industry, practitioners and workers. The college believes in team approaches that require extra effort and special institutional and administrative support, because they enrich research endeavours and their outputs, enhance the University's teaching mandate, and often provide important applied learning experiences for students. The college currently has collaboration with more than 20 international organisations.

6.5 Social Engagement

CCE researchers use their learning, ingenuity, and creativity to participate in dialogue and work toward common purposes with community partners. Drawing on the strengths and expertise of different stakeholders, they co-create and apply evidence-based research to address shared challenges; guide and develop policies, practices and products; provide innovative learning environments and professional experiences for students at all levels; improve professional practices; and seek out and support initiatives that result in tangible improvements for individuals and communities.

7. AREAS OF RESEACH EXCELLENCE

CONDITION MONITORING AND MAINTENANCE MANAGEMENT
RELIABILITY MODELING AND ANALYSIS
WASTE TREATMENT AND WASTE MANAGEMENT
DESALINATION & WASTE WATER TREATMENT
ELECTRICAL AND SOLAR THERMAL ENERGY MANAGEMENT
REFRIGERATION AND THERMAL ENGINEERING

MECHATRONICS SYSTEM ENGINEERING
ENGINEERING EDUCATION AND PROFESSIONAL DEVELOPMENT
CONCRETE TECHNOLOGY, INNOVATIVE ENVIRONMENTAL FRIENDLY CONSTRUCTION MATERIALS & STRUCTURAL ENGINEERING
WATER RESOURCES MANAGEMENT, DESALINATION, SUBSURFACE AND SURFACE DRAINAGE:
COASTAL ENGINEERING:
MANUFACTURING METHODS, CAD/CAM & OPTIMIZATION AND MODERN MATERIALS
PRODUCTIVITY IMPROVEMENT THROUGH LEAN MANUFACTURING SYSTEMS (LMS)
COMPONENT BASED SOFTWARE DEVELOPMENT
BEHAVIORAL MODELING OF RF AND MICROWAVE CIRCUITS, FOR WIRELESS COMMUNICATIONS APPLICATION
AUTOMATIC CONTROL SYSTEM DESIGN
NEURO-FUZZY AUTOMATED SEGMENTATION MEDICAL IMAGES

8. KEY RESULT AREAS

- Establish a TRC research chair in water resources and waste management
- Recruit high profile staff with a track record in the identified fields of excellence to secure grants and deliver graduate programmes
- Build institutional research capacity
- Encourage exchange of professors and senior faculty for research development
- Develop undergraduate programmes in water and waste management areas
- Develop graduate programmes in strategic areas of importance
- Establish inter-national links with top organisations and research networks
- Work closely with government bodies to align research with national objectives
- Encourage applied research relevant to local community needs
- Seek open research grants
- Support innovation and patent new ideas