

## ENVIRONMENT AND ENERGY RESEARCH CLUSTER

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RESEARCH CLUSTER CODE	EE
NO. OF PROGRAMME	4
NO. OF GROUP	5
NO. OF RESEARCH CENTRE	2
SYNOPSIS	<p><i>This research cluster covers advanced power and energy, environmental quality management and sustainable development, green technology and recyclable energy and water security and management.</i></p> <p>Kelompok penyelidikan ini meliputi kuasa termaju dan tenaga, pengurusan persekitaran berkualiti dan pembangunan mampan, teknologi hijau dan tenaga kitar semula, pengurusan dan keselamatan air</p>
DESCRIPTION (with NABC elements)	<p><b>Need</b></p> <ul style="list-style-type: none"> <li>• Determination and characterization of energy source, pollutants sources and green energy</li> <li>• Managing of environment, water and energy in the sustainable ways is severely lacking</li> <li>• Malaysia needs environmental forensics to pin down the polluters since the techniques enable the expert to accurately trace the origin of toxic pollutants spilled into the environment.</li> <li>• Management of coastal waters to minimize pollutants from land and sea-based</li> <li>• Tracing down the origin of these multiple diffuse sources of pollutants is now possible with Environmental Forensics techniques established in UPM.</li> </ul> <p><b>Approach</b></p> <ul style="list-style-type: none"> <li>• Multi and transdisciplinary research programmes (including in theoretical and methodological approaches)</li> <li>• Build on existing expertise</li> <li>• Higher visibility (build critical mass)</li> <li>• Mentoring next generation of scholars</li> <li>• Integrated, coordinated research groups</li> <li>• Multi centers (university wide research groups)</li> <li>• International linkages</li> </ul> <p><b>Benefit to UPM</b></p> <ul style="list-style-type: none"> <li>• Cost savings – avoid duplication of research</li> <li>• Efficient use of resources</li> <li>• More focused programmatic research and activities</li> <li>• Build research team culture</li> <li>• Transparency – every scholar in the cluster is aware of who is doing what</li> </ul> <p><b>Benefit to Society</b></p> <ul style="list-style-type: none"> <li>• Track record of research (knowledge bank, repository in the area of research)</li> <li>• Efficient allocation and use of resources for societal development</li> <li>• Improve quality of service delivery</li> <li>• Alleviate social problems and improve quality of life</li> </ul> <p><b>Competitor</b></p> <ul style="list-style-type: none"> <li>• UM is strong in humanities (anthropology, sociology, political science, language) and public admin/ development studies</li> <li>• UKM is strong in civilization studies, language and preschool education</li> <li>• USM is strong in archeology, social work</li> </ul>

Code	Research Programme	Synopsis	Leader of Research Programme	Research Groups
EE01	Advanced Power and Energy	<p>Nowadays, power systems are required to operate at the critical stability limit. With the increase of demand and growing concerns on the use of fossil fuels in power plants, new paradigms of researches are needed in commercial and technical of electric power generation worldwide. Stable, reliable and quality electrical supply are paramount for the growth of a country. Without these requirements, monetary losses will be incurred due to intermittent blackouts, prolonged power quality problems and the quality of people lives will be affected. It would also ensure the competitive edge for Malaysia's foreign direct investment compared to our neighbouring countries. Thus, continuous and detailed study should be conducted to ensure the usage electricity supply is available and in safe conditions.</p> <p><b>Keywords:</b> Power System, Renewable Energy, Power Electronic and Drives</p>	<p>Prof. Ir. Dr. Norman Mariun (FK)</p> <p>norman@eng.upm.edu.my</p>	1. Advanced Power and Energy - Prof. Ir. Dr. Norman Mariun (RC / FK)
EE02	Environment Quality Management and Sustainable Development	<p>Environmental forensics uniquely covers all aspects of pollution and contamination in air, water, soil and biota. Research in this field deals with the identification of sources, distribution and transport pathways of pollutants. Pollutants tend to accumulate in the environment forming potentially toxic contaminants. Subscribing to modern lifestyle, human has directly and indirectly released organic and inorganic pollutants into our environment. The benefits of having sound environmental forensics program are immense particularly because the sources, distribution and transport pathways of emerging contaminants of environmental concerns can be identified at early stages. Thus, costly potential environmental disasters in the short and long terms can be avoided. In view of this, there is an urgent need to regulate these contaminants in our environment.</p> <p><b>Keywords:</b> environmental forensics, environmental pollution, pollutants</p>	<p>Prof. Dr. Mohamad Pauzi Zakaria (FPAS)</p> <p>mpauzi@env.upm.edu.my</p>	<p>1. Environmental Management And Sustainability (Emas) – Prof. Dr. Mad Nasir Shamsuddin (FPAS)</p> <p>2. Environmental Forensics - Dr. Ahmad Zaharin Aris (RC / FPAS)</p>
EE03	Green Technology and Renewable Energy	<p>This research group (GTRE) undertakes projects that fulfil the needs of human being in facing extreme challenges related to energy use, water and natural resources. Research activities that contribute to developing green technology, cleaner processes and bio-products are given focus. The searches for innovative solution such as energy saving system, renewable energy supplies and application of environmental friendly materials have found greatest demand in the world today. The intelligent use of waste resources such as biomass to produce green power is an illustration of our advancement in scientific capability to innovate new technology. This GTRE Group forms an integrated specialist team that draws experts together from chemical, biological, water, mechanical, electrical and computer engineering.</p> <p><b>Keywords:</b> Waste to Wealth, Waste Recycling, Waste Recovery, Biofuel, Energy saving.</p>	<p>Prof. Dr. Azni Idris (FK)</p> <p>azni@eng.upm.edu.my</p>	1. Green Technology and Renewable Energy - Prof. Dr. Azni Idris (FK)
EE04	Water Security and Management	<p>This research program focuses on sustainable utilisation as well as preservation and protection of water resources. The total quantity of water in the world is more or less finite, however the quantity that is available for use may decrease due to increase in demand and pollution problems. Therefore, it needs to be utilised efficiently and protected from pollution. Water can also be a source of disaster when it is available in excessive quantity at one location, and hence it needs to be properly controlled. Research areas under this program include modern systems in irrigation and drainage, best practices in river and flood control, control of pollution and salt water intrusion, preservation and augmentation of water resources and use of hydro-informatics for modeling, design and management of water resources systems.</p> <p><b>Keywords:</b> sustainable utilization, pollution and flood control, resource augmentation.</p>	<p>Assoc. Prof. Dr. Abdul Halim Ghazali (FK)</p> <p>abdhalim@eng.upm.edu.my</p>	1. Water Resources – Assoc. Prof. Dr. Abdul Halim Ghazali (FK)