



**THE ENERGY CENTER, KNUST**



**KUMASI, GHANA**



**REGULAR & ADVANCED  
SHORT COURSES**

**2013**



# THE ENERGY CENTER (TEC)

COLLEGE OF ENGINEERING

Kwame Nkrumah University of Science and Technology

**KUMASI, GHANA**

2013 REGULAR & ADVANCED  
**SHORT COURSES**

## SPONSORS AND PARTNERS:



# INTRODUCTION

As part of its contribution to building national and sub-regional capacity in developing sustainable energy systems, The Energy Center (TEC) of the Kwame Nkrumah University of Science and Technology (KNUST) Kumasi, Ghana, has been running short training programmes in renewable energy technology and energy policy over the past 4 years, with the support of its partners.

The Center under the Renewable Energy Education Project (REEP) of the EDULINK Programme of the EU-ACP Secretariat has since 2009 been running programmes in:

▶ Solar Photovoltaic Systems Design and Installation (off-grid and grid-connected)

▶ Biogas Systems Design and Construction

▶ Biofuels Technology and Economics

The partners in REEP (which ended in Dec 2011) were the International Institute for Water and Environmental Engineering – 2iE, Ouagadougou, Burkina Faso and Université du Havre in France.

In 2011, advanced courses were introduced which targets engineers and other practitioners in the energy sector (with a minimum of a University Degree in Science or Engineering) who require more sophisticated analytical tools for design and decision-making. These advanced courses have been packaged from the

The Energy Center (TEC) started activities in 2006 and was formally approved by the Academic Board of Kwame Nkrumah University of Science and Technology (KNUST) in 2009. Over the years TEC has provided a platform for the pursuit of multidisciplinary research and development activities at KNUST, pulling resources from the College of Engineering (CoE) as well as other Colleges of the university. Thanks to these activities TEC's vision to become "aglobally-recognized centre of excellence for energy in Africa" is fast becoming reality and this report will highlight achievements over the last academic year, from about July 2011 to May 2012.

e-learning Masters programme in Renewable Energy Technologies (MSc RETs) which is run by The Energy Center and the Department of Mechanical Engineering of KNUST. These advanced short courses include: Energy Policy and Planning, Solar PV and Solar Thermal Technologies, Renewable Energy (RE) Project Analysis and Grid- Connected Solar PV.

The Energy Center together with its partners in REEP, has trained over 200 technicians, engineers and other energy experts across almost 15 different African countries.

In 2010 the World Bank agreed to support the West African partners in REEP under a Solar Capacity Upgrading Project (SolarCUP), through the AFREA- Africa Renewable Energy (RE) programme. This project is ongoing, and has provided additional support for our training programmes.

This brochure is produced to provide basic information and guideline on training programmes and workshops at The Energy Center, KNUST for 2013.

In running these training programmes and workshops, TEC hopes to actively contribute to achieving the goals of the ECOWAS Regional Center for Renewable Energy and Energy Efficiency (ECREEE), with whom KNUST has recently signed a Memorandum of Understanding.

All the events herein will take place at The Energy Center, KNUST, in the historic city of Kumasi in Ghana.



# Regular Short Courses

WIND ENERGY TECHNOLOGY

BIOFUELS TECHNOLOGY AND ECONOMICS

DESIGN AND INSTALLATION OF STAND-ALONE SOLAR PV SYSTEMS

BIOGAS SYSTEMS DESIGN AND CONSTRUCTION

# Wind Energy Technology

## COURSE OBJECTIVES

To train participants and to equip them with the appropriate knowledge in wind energy study to empower them to serve as conduits for the dissemination of knowledge in wind power technology in Ghana and other parts of Africa.

## COURSE DESCRIPTION

Theory, Analysis, Design and Applications of Wind Power Technology; Wind Resource Assessment; Introduction to the RETScreen Software in Wind Power Technology; Construction of small/micro wind turbine.

## TARGET PARTICIPANTS

B.Sc. Degree holders in Engineering, Science, Wind Technicians, Wind Developers and Professionals with HND (Engineering) and the allied sciences with the dexterity to construct artifacts.

## INSTRUCTORS

Mr Emmanuel Osei, The Energy Center, KNUST

Mr Eric Osei Essandoh, The Energy Center, KNUST

Mr John Smorley, Head Engineer, Ayrton Drugs

**Places Available:** 20

**Date:** 14 – 18 January, 2013

**Fee:** GH ¢ 400 / \$ 200

# Biofuels Technology and Economics

## COURSE OBJECTIVES

Course participants will acquire skills in the extraction, processing and utilization of biofuels from various feedstocks.

## COURSE DESCRIPTION

Classification and assessment of feedstocks for biofuel (biodiesel and bioethanol) production; mechanical, thermal and chemical techniques for biofuels extraction and processing; comparison of performance and emission characteristics of biofuels and conventional petroleum fuels; economic evaluation of biofuels extraction and processing

## TARGET PARTICIPANTS

Fuel processing and production companies; oil companies who want to position themselves for the future; community development organizations; NGOs and other organizations interested in alternate and sustainable fuel production; etc

## INSTRUCTORS

Prof Mensah, Department of Agric Engineering, KNUST

Dr Johannes Awudza, Department of Chemistry, KNUST

Dr Moses Mensah, Department of Chemical Engineering, KNUST

**Places Available:** 20

**Date:** 20 – 24 May, 2013

**Fee:** GH ₵ 300 / US \$ 150



# Design and Installation of Stand- Alone Solar PV Systems

## COURSE OBJECTIVES

This course trains participants design, install and manage off-grid solar Photovoltaic systems

## COURSE DESCRIPTION

Solar radiation resource assessment; characteristics of commercially available PV Cell technologies; PV System Design (Load Assessment, PV array sizing, charge regulators, battery bank, cabling, etc); Installation, System maintenance and Management; Economic Assessment of PV projects.

## TARGET PARTICIPANTS

Practicing engineers and technicians etc.

## INSTRUCTORS

Mr Edwin Adjei, Solar Energy Applications Laboratory (SEAL), KNUST

Dr David Anipa, Computer Engineering Department, KNUST.

**Places available:** 20

**Date:** 20- 24 May, 2013

**Fee:** GH ¢ 300 / \$ 150

# Biogas System Design and Construction

## COURSE OBJECTIVES

The course aims at training participants in the design, construction and management of biogas systems.

## COURSE DESCRIPTION

Theory of Biogas Technology; Practical Applications of Biogas Technology; Design of Biogas Plants; Biogas Piping and End-use Appliances; Operation & Maintenance and Safety Management of Biogas Systems

## TARGET PARTICIPANTS

Practising engineers and technicians, students, NGOs, etc

## INSTRUCTORS

Dr Elias Aklaku, Agric Engineering Department, KNUST

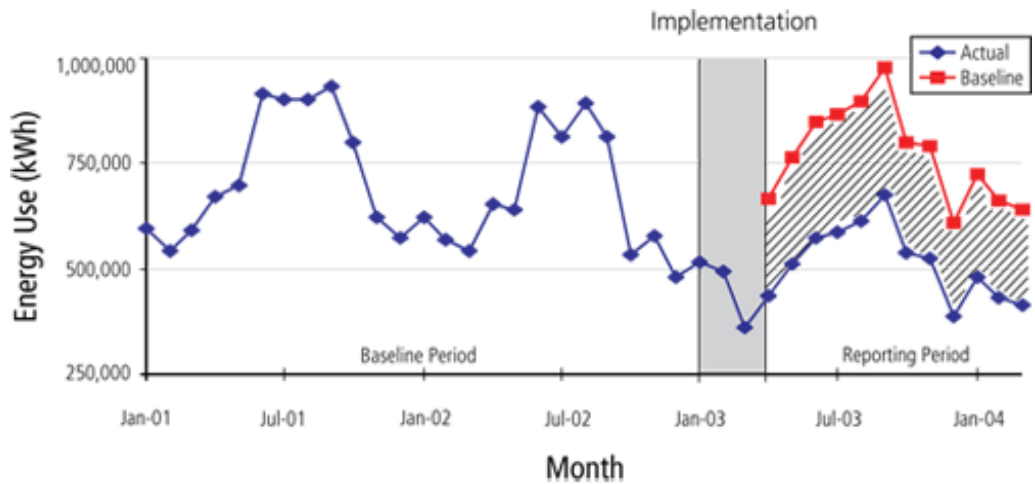
Mr. Edward A. Awafo, KNUST

**Places Available:** 20

**Date:** 27 May – 1 June, 2013

**Fee:** GH ₵ 300 / \$ 150





# Advanced Short Courses

RENEWABLE ENERGY PROJECT ANALYSIS (RETScreen & WASP)

ENERGY POLICY AND PLANNING

# Renewable Energy Project Analysis ( RETScreen & WAsP)

## COURSE OBJECTIVE

The course aims at enhancing skills of its participants at using world-class tools in the analysis of renewable energy and energy efficiency projects.

## COURSE DESCRIPTION

Overview of tools available in RETScreen Clean Energy Analysis Software; Application of RETScreen for Solar PV project analysis; Assessment of Wind and Solar Water Heating using RETScreen; Financial and Risk assessment with RETScreen; Greenhouse gas emissions analysis;

Introduction to WAsP for Wind Energy Projects; Mini project

## TARGET PARTICIPANTS

Practising engineers and energy economists, renewable energy project developers, energy planners, graduate students, etc

## INSTRUCTORS

▶ Prof Abeeku Brew-Hammond, Director, The Energy Center, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi Ghana

▶ Mr David A Quansah, Lecturer, Mechanical Engineering

▶ Mr Emmanuel Y Osei

▶ **Places available:** 25

**Date:** 25 February- 8 March 2013

**Fee:** US \$ 300/ GH ¢ 600

# Energy Policy and Planning

## COURSE OBJECTIVES

This short course is designed to provide energy policy and planning officers with the current tools and instruments for planning sustainable national and regional energy systems.

## COURSE DESCRIPTION

Global and local trends and developments in Renewable Energy Technologies (solar, wind, bioenergy, etc) and energy efficiency, economics and pricing of renewable energy systems, overview of energy policies and policy instruments that facilitate investment in renewable energy technologies (renewable energy targets, feed-in-tariffs, etc), energy sector institutional frameworks, policies for energy access and capacity building; case-studies and analysis of successful and unsuccessful policy options; introduction to energy planning and national energy balance calculations, introduction to Long-range Energy Alternatives Planning (LEAP), review of national and regional renewable energy policy documents in both developing and industrialized nations.

## TARGET PARTICIPANTS

National Energy Institutions, planners, researchers, policy makers, etc

## INSTRUCTORS

▶ Prof Abeeku Brew-Hammond, Director, The Energy Center, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi Ghana

▶ Prof Yezouma Coulibaly, Lecturer, International Institute for Water and Environmental Engineering – 2iE, Ouagadougou, Burkina Faso

▶ **Places available:** 25

**Date:** 11 – 22 March, 2013

**Fee:** US \$ 500 / GH c 1000



# GENERAL NOTICE TO APPLICANTS

All fees paid include snacks, lunch and course manuals. Participants are however requested to take note of the following:

**Accommodation** – the fee does not include accommodation in Kumasi. Persons who require assistance in arranging accommodation may contact us (see back page) for such logistical support. ECOWAS citizens do not need entry visa to Ghana, non-ECOWAS citizens may also contact us for the necessary support in obtaining entry visas.

All the events both trainings and workshops will take place at The Energy Center of the Kwame Nkrumah University of Science and Technology, Kumasi Ghana.

A **25% discount** is available for qualified female participants in training programmes

Advanced short courses (Pgs 9-11) are usually open to persons with a minimum of a first University degree in engineering or science. Prospective applicants who do not meet this minimum requirement, but possess 2 years or more of relevant experience may send their CVs for advice.



### **CONTACT INFORMATION**

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Coordinator of Short Courses

#### **The Energy Center**

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