



## Hydro and Ocean Energy

4-9 September 2017

Room M206, Department of Mechanical and Mechatronic Engineering, Stellenbosch University

### Synopsis

Ocean and hydro power can make a significant contribution to the generation of renewable electricity. In this introductory course both ocean and hydro energy associated with the elevation or movement of water will be studied, giving students a basic overview of the relevant resources, conversion technologies, project development and implementation, and the associated environmental and economic impacts.

### Hydro Energy

The course deals with the aspects listed here: Environmental, social and economic impacts and the Hydrological Impact Assessment Protocol. World and South African hydrological resource magnitude. Existing hydro installations in the world and in Africa. Types of hydro power plants and turbines. Turbine selection criteria: specific speed and specific power parameters. Turbine efficiency. Hydraulic design, hydraulic losses, pipe friction and other losses. Multiple turbine units. Basic operational constraints. Costing. Cost of hydro power. Micro hydro power systems. Technology developments. Future scenarios.

### Ocean Energy

It is possible to extract energy from ocean waves, currents, tides, and salinity and temperature gradients, and use them to generate electricity. In this course the different ocean energy resources will be studied as well as the conversion technologies applicable to each. In addition aspects such as resource measurement and assessment, technology readiness, environmental concerns and the economics of ocean energy projects will be addressed, with particular emphasis on the available resource along the South African coast.

**No academic credits can be obtained by attending this course as short course for industry.**

### Who should attend

Engineers, technologists and technicians active in the energy sector. Architects, planners and developers. Government and local authority officials. Environmental Investors.

### Certification and Accreditation

The module has been registered with the Engineering Council of South Africa for Continuous Professional Development points. A Certificate of Attendance with an indication of the CPD points and level will be awarded to all participants who attend the full course from Monday morning to Saturday lunchtime.

### Venue and Time

This course will be presented at the Department of Mechanical and Mechatronic Engineering at Stellenbosch University and will run Monday to Friday, 4-8 September 2017 from 08:00 to 17:00 and on Saturday 9 September 2017 from 09:00 – 13:00. Directions to the venue can be obtained from: <http://mecheng.sun.ac.za/index.php/en/contact-us>.

### Travel and Accommodation

All travel arrangements are for your own account. The Stellenbosch Information Bureau can be contacted at tel. 021-883 3584 for available accommodation near the university. A list of available guesthouses can also be obtained from [crses@sun.ac.za](mailto:crses@sun.ac.za)

### Registration

The course is designed for a restricted number of attendees so as to personalize and maximize the learning experience. Bookings will be taken on a first come first served basis. Registration must be done online at:

<http://apps.sun.ac.za/SCD/ApplicationForm.aspx?courseid=4474>

No registration is final until you have received a confirmation by email from Stellenbosch University.

**Registrations close on Friday 18 August 2017**

### Course Fees

- Course fee for the five and a half-day course: R9500
- **Cancellation of enrolment made up to and including Friday 18 August 2017 will be subject to a 15% handling fee.**
- No refunds will be made after this date; however, substitutions will be accepted.
- Attendance without payment will not be permitted.
- In the case of unforeseen circumstances Stellenbosch University reserves the right to cancel the course or change

the lecturer with two weeks' notice, in which case all fees will be reimbursed in full on request.

- The course fee includes all study material, tea/coffee and lunches.

### Presenters:

**Prof. Wikus van Niekerk** holds a PhD in Mechanical Engineering from the University of California at Berkeley and is the Director of the Centre for Renewable and Sustainable Energy Studies. His main research areas are the conversion of the energy in ocean waves and currents to useful mechanical and electrical power. He

has published a number of papers and articles in the area.



**Prof. Theodor von Backström** holds PhD and DEng degrees (Stellenbosch). He taught Turbomachinery and Fluid Dynamics at Stellenbosch. He supervises graduate students in fluid machinery and renewable energy systems, and is rated by the National Research Foundation as a researcher with considerable international recognition.



Centre for Renewable and Sustainable Energy Studies



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