



Elite Scientific Instruments Sdn. Bhd.,
A-LG-03, Block A , Section 1, Serdang Perdana Selatan
43300 Seri Kembangan,
Selangor Darul Ehsan
Tel : (603) 8945 6100 Fax : (603) 8945 7100

Course Title	: Basic of Eddy Covariance Technique	Course Duration	: 2 day (s)
Course Code	: EC	Course Venue	: CEMACS, Universiti Sains Malaysia (USM)
Course Category	: Eddy Covariance Program		
Course Level	: Intermediate	Course Fee	: RM 1500

➤ **Objective of Training**

At the end of the course, the participants will be expected to:

- 1) Acquire basic knowledge and overview on the technical matter related to the eddy covariance technique.
- 2) Understand the working principles and operation of the eddy covariance technique.

➤ **Background facilities**

The workshop training comprises of two sessions, Theory Session on Day 1 and Practical Session on Day 2 to ensure the participants will be able to understand thoroughly the course content. The venue for the training will be at Universiti Sains Malaysia (USM), Pulau Pinang for the Theory and Practical sessions and at The Centre for Marine and Coastal Studies (CEMACS) for the site visit. CEMACS was established in August 1991 to undertake research and post-graduate training in Marine Science and Coastal Ecosystems. Its main objective is to enhance the capability of conducting integrated inter-and multi-disciplinary studies leading towards solving problems related to marine and coastal ecosystems. CEMACS is located at Teluk Aling at the northwest coast of the island of Pulau Pinang in the Penang National Park. It provides the institutional mechanism for mobilising and integrating the University's considerable expertise and resources in marine science. For more information, please go the website <http://cemacs.usm.my>

➤ **Background of Speaker**

This course will be led by **Associate Professor Dr Yusri Yusup** who has a wide knowledge and working experience in the Environmental Technology Program. Aside from teaching, Dr Yusri is currently conducting research on water-atmosphere and land-atmosphere interactions using the eddy covariance (EC) method. Furthermore, Dr Yusri has an EC tower to measure moisture and carbon dioxide fluxes and other meteorological parameters at CEMACS to study the carbon and water cycles of the tropical coastal ocean. In a joint research project with the Malaysian Palm Oil Board (MPOB), he also works on examining the net ecosystem exchange of carbon dioxide over the oil palm plantation ecosystem.

➤ **Introduction**

The eddy covariance technique is the reference method to measure mass, momentum, and energy fluxes from many types of surfaces. The surfaces include the natural, water, agriculture, and urban surfaces. Engineers and scientists apply this powerful technique to quantitatively assess the productivity of the agricultural land and the natural ecosystem. To adequately use the technique, the user requires basic knowledge on the atmospheric boundary layer, physics, and statistics. In this training, the trainer will explain the fundamentals of the eddy covariance technique and give practical examples to strengthen the participants' understanding of the technique. The knowledge will allow the participants to build and design their own eddy covariance system that is suited for their application.

➤ **Target Group**

This training is designed especially for researchers, academicians, engineers, managers and policy makers. Others also are welcomed to join this program.

➤ **Course Outline**

Slot 1: Basics of Atmospheric Boundary Layer

- Mean boundary layer characteristics
- Statistical description of turbulence

Slot 2: Overview of Eddy Covariance Principles

- Eddy covariance theory
- Flux measurements
- Basic derivations
- Major assumptions and errors

Slot 3: The Eddy Covariance Instrumentation

- Experimental design
- Positioning
- Footprint

Slot 4: Handling and Maintenance Equipment

- Components of equipment and functions
- Preventive maintenance

Slot 5: Data Processing of EC Data

- Unit conversion
- Quality control
- Time averaging
- Data output and networking

Slot 6: Site Visit to Eddy Covariance Station at CEMACS, USM

- Briefing on the EC station at CEMACS



Elite Scientific Instruments Sdn. Bhd.,
 A-LG-03, Block A , Section 1, Serdang Perdana Selatan
 43300 Seri Kembangan,
 Selangor Darul Ehsan
 Tel : (603) 8945 6100 Fax : (603) 8945 7100

➤ **Tentative program**

Date & Time	Activities	Venue
<u>Day 1</u>		
8:00 AM	Registration	
9:00 AM	Slot 1: Basics of The Atmospheric Boundary Layer	
10:00 AM	Slot 2: Overview of the Eddy Covariance Principles	
10:45 AM	Tea Break	
11:00 AM	Slot 3: The Eddy Covariance Instrumentation	
1:00 PM	Lunch break	
2:00 PM	Slot 4: Handling and Maintenance Equipment	
5:00 PM	Dismiss	
<u>Day 2</u>		
7:30 AM	Gather at gathering site, USM Penang	
8:00 AM	Site visit to Eddy Covariance Station at CEMACS, USM	
1:00 PM	Closing ceremony / Photo session/ Lunch break/ Dismiss	