



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	: Controlled Environment Agriculture	Course Duration	: 2 day (s)
Course Code	: CEA	Course Venue	: TBA
Course Category:	Plant Production Systems		
Course Level	: Beginner	Course Fee	: RM 500 per person

➤ **Objective of Training**

At the end of the course, the participants will be able:

- 1) To comprehend the concept of Controlled Environment Agriculture (CEA) and its application in current agricultural interests.
- 2) To run CEA and conduct various crop production research by manipulating various environmental factors.

➤ **Background facilities**

The training workshop will be completed in two sessions, Theory Session on Day 1 and Practical Session on Day 2 to ensure all participants have a good comprehension regarding the subject matter. The venue for the training course will be announced **one month** before the scheduled date of the workshop.

➤ **Background of Speaker**

This course will be given by our Plant Science Consultant, **Dr Muhammad Nazmin bin Yaapar** who has a wide knowledge and experience in general plant physiology and rice science research. Dr Muhammad Nazmin Yaapar is affiliated to the Department of Crop Science, Universiti Putra Malaysia, where he is currently working as a Senior Lecturer. He has experience in teaching various plant science subjects at university level including agriculture botany, weed science, crop nutrition, rice production and crop physiology. He has authored and co-authored several national and international publications and also working as a reviewer for reputed professional journals. Moreover, he is having an active association with a photosynthesis research team in the United Kingdom. He has been regularly recognised by the local media as the reference scientist particularly in rice cultivation and crop improvement.

➤ **Introduction**

Controlled environment agriculture (CEA) is a technology-based approach toward food production. CEA aims to provide protection and maintain optimal growing conditions throughout the development of the crop. Production takes place within an enclosed growing structure such as a greenhouse or building. Plants are often grown using hydroponic methods to supply the proper amounts of water and nutrients to the root zone. The entire process of controlled environment agriculture focuses on making the most of space, labour, water, energy, nutrients, and capital to operate while still producing a bountiful harvest. Computers today can operate hundreds of devices within a greenhouse by utilising dozens of input parameters to maintain the most desired growing environment. The technology of CEA is changing rapidly with systems today thus producing yields never before realised

➤ **Target Group**

This training is designed especially for researchers and growers who wish to venture into a more modern and sophisticated crop production system. Learn the arts of growing crops free from harmful biotic and abiotic influences for maximum harvest

➤ **Course Outline**

Slot 1: Five Basic Needs of Plants

- Air: Temperature, Humidity, CO₂ and O₂ concentration
- Light: Spectrum, Intensity, Photoperiod
- Water: Temperature, pH, EC, Oxygen content
- Nutrients: Composition, Purity
- Growing Medium: Air content, Moisture content
- Q and A session

Slot 2: Photosynthesis Machinery

- Light-dependent reactions: PS II, pigments, electron transport, ATP and NADPH production
- Light-independent reactions: Calvin cycle, Rubisco, G3P
- Stomata
- Photorespiration
- C₃ vs C₄ vs CAM plants
- Q and A session

Slot 3: The Concept of Controlled Environment Agriculture

- What and Why CEA?
- Various CEA structures
- CEA components and mechanisms
- Plant requirements interaction with biotic and abiotic factors
- CEA crops and systems
- Q & A session

Slot 4: CEA Visit

- CEA mechanism, behind the scenes
- CEA components familiarisation
- Plants maintenance
- CEA Dos and Don't's

Slot 5: Feedback and Troubleshooting

- General discussion with Q and A
- CEA potential and versatility



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➤ Tentative program

Date & Time	Activities	Venue
<u>Day 1</u>		
8:00 AM	Registration	TBA
9:00 AM	Slot 1: <i>Five Basic Needs of Plants</i>	
10:30 AM	Break	
11:00 AM	Slot 2: <i>Photosynthesis Machinery</i>	
1:00 PM	Lunch break	
2:00 PM	Slot 3: <i>The Concept of Controlled Environment Agriculture</i>	
4:30 PM	Dismiss	
<u>Day 2</u>		
8:30 AM	Slot 4 <i>CEA Visit</i>	TBA
10:00 AM	Break	
10:30 AM	Slot 5: <i>Feedback and Troubleshooting</i>	
12:00 PM	Closing ceremony / Photo session/ Lunch break/ Dismiss	