RAPID AND PRECISE ASSESSMENT OF PHYSIOLOGICAL RESPONSE OF PLANTS TOWARDS STRESS USING COMPUTERIZED AND PORTABLE INSTRUMENTS

Over view

Research in crop physiology relies on a strictly defined set of measuring devices and instruments that are referred collectively as research apparatus. Specific instruments which address the unique needs of research and research hypotheses guarantee reliable results and contribute to the achievement of research objectives. The first field experiments involving measuring equipment were conducted in the 19th century by Lawes and Gilbert in the Rothamsted Experimental Station in England. The subject matter and complexity of research studies continued to increase over the years, which stimulated the development of specialist equipment for analysing various phenomena in plant functions. Modern research equipments have revolutionized measurements, read-outs and interpretations of results. This course discusses some of the basic equipments used in crop physiology research for measuring the properties and parameters of plants and crop stands with the aim of improving productivity. For this course, the foreign academician will bring a set of portable instruments to give not only the theoretical background of the valuable techniques but also to give hands-on training for all participants.

The tools and instruments are expected to contribute to scientific progress, including the breeding of new plant varieties that more effectively convert solar energy to biomass, have lower demand for water and are more resistant to multiple environmental stressors. Modern equipment assists researchers and practitioners in improving the effectiveness of agricultural practices and crop characteristics. The obtained results can be used to develop reliable models for predicting and controlling plant production in the face of environmental changes caused by global warming, soil contamination etc.

This course is based on giving the students and professionals a theoretical and practical experience related to the use of a wide range of portable and computerized devices that allow performing different type of measurements in non-invasive way to evaluate plants physiological status, performance and response to environmental conditions, based on principals of plant physiology.

Objectives

- Exposing participants to the fundamentals of plant productivity.
- Analysing the physiological responses of plants to agricultural treatments.
- Measuring photosynthetic potential: this includes the measurements of light (its quantity and quality), photosynthetic productivity and efficiency.
- Giving the ability to use modern and computerized devices in agricultural and biological research.
- Extending the basic knowledge of the principles of operation of devices.
- Forwarding the knowledge to design agricultural experiments.
- Teaching the ability to work in a group in the field.

Course date	**1st to 5thApril, 2019**
Main focal themes	The aim of this course is to provide students with comprehensive knowledge related to the employment of very advanced instrumentations in the field of plant science including: agronomy, horticulture, biology, botany, crop sciences, forestry, ecology, soil science, meteorology, plant physiology.
Host institute/venue	Department of Botany, University of Calicut
Participants	Limited to 40
Who should attend	✓Researchers from scientific institutes, service and government organizations including R&D laboratories. ✓Students at all levels (MSc/M.Phil/PhD) and/or Faculty from academic institutions. ✓Technicians, teachers, lecturers, scientists, advanced professionals in the area of plant biology.
Course registration fees	The participants fees for taking the course is as follows: ▪**Faculty : Rs. 4000/-** ▪**Research scholars / students from other institution : Rs. 3000/-** ▪**Research scholars /students from host institution :Rs. 2000/-** The above fees (inclusive of GST) includes all **instructional materials, lunch and refreshments for 5 days.** Expenses for accommodation and the travel should be met by the participants.
Accommodation	The participants (students) will be provided with hostel accommodation, depending on the availability, on payment basis. The faculty & working professionals will be provided with faculty guest house accommodation, depending on the availability, on payment basis.

Registration process

Step 1: GIAN web Portal Registration: Register in the GIAN portal i.e. http://www.gian.iitkgp.ac.in/GREGN/index by paying Rs. 500/- online. Registration to this portal is the one-time affair and will be valid for the lifetime of GIAN. Please note that course fee is separate.

Step 2: Login to the GIAN portal with the registered User ID and Password. Choose for the Course registration option. Select the course titled **"Rapid and precise assessment of physiological response of plants towards stress using computerized and portable instruments"** from the list and click the "Save" option. Confirm your registration by clicking the suitable option.

Step 3: Course Short listing: Candidates will be intimated through email regarding their selection after the last date of submitting the application – **March 10, 2019**

After registration in GIAN portal , please send your short resume to, uocgian@gmail.com before March 10, 2019 to facilitate the short listing of candidates.

Step 4: Course Fee Remittance: Once you receive the intimation from the Course Coordinator, the fee (as applicable) need to be paid. The participants will be provided with accommodation (if available) on payment basis.

Mode of payment: Mode of payment will be intimated to the shortlisted candidates.

The registration form (Given in Page no. 6 of this brochure) should be filled and scanned copy of the same to be send to Course Coordinator only after receiving intimation to the short listed candidates.

Course Coordinator

Dr. Jos T. Puthur
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The faculty

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Dr. H. M. Kalaji is Vice Chair of the Scientific Committee MSCA, European Commission, Belgium and leading expert in the field of stress physiology, photosynthesis, photosynthetic productivity, photosynthetic efficiency, plant talk, phenotyping, machine learning. He is an Assessor of 'HR excellence in research' award, European Commission, BE and Scientific consultant in Central & Eastern Europe and the Middle East. He has 15 years of teaching experience and he was honored with Rector's Award of SGGW for scientific achievements. He has outstanding skills for conducting interdisciplinary collaborative research projects, development of framework programs in the field of plant science. As part of his scientific research activities he have research collaboration with various foreign research centers. He is a member of committees and editorial boards of reputed scientific journals, international and national organizations and scientific societies. He has published 150 research publications in well reputed international journals and chapters in books. He has achieved HI- 22. Sum IF- above 200. He has delivered invited lectures at 20 different international Universities/institutes.

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Dr. Jos T. Puthur is an eminent plant physiologist and expert in the area of 'osmoregulation, biochemical and molecular responses, as well as alteration in photosynthetic processes of plants to abiotic environmental stresses'. He was awarded with TWAS Research grant for promising scientific research projects, BOYSCAST fellowship of DST, Govt. of India, UGC Fellowship under Indo-Hungarian Educational Exchange programme, and TWAS-UNESCO Associate ship at centers of Excellence in South (CEFOBI, Rosario, Argentina). He is a faculty member of the massive online open course (MOOC) of Consortium for Educational Communication (CEC), MHRD, Govt of India. He was selected as a visiting scientist under INSA-DFG programme of International Scientific Collaboration and Exchange of Scientists to Institut für Molekulare Physiologie und Biotechnologie der Pflanzen (IMBIO), University of Bonn, Germany. He was a Visiting Scientist at Institute of Plant Biology, Biological Research Centre, Hungarian Academy of Sciences, Hungary. He has guided 8 students for PhD and published 70 research publications in well reputed national and international journals.

Tentative Lecture plan
(01.04.2019-05.04.2019)

	Session	Duration	Faculty
Day 1	**Lecture 1** Overview: The use of the computerized instruments in the field	1 hr	H.M. Kalaji
	Tutorial 1 Detailed demonstration of the computerized instruments in the field	2 hr	H.M. Kalaji
Day 2	**Lecture 2** Light intensity and quality influencing the crop productivity	1 hr	J.T. Puthur
	Lecture 3 Plant and canopy architecture -Leaf Area Index and Leaf Tip Angles	1 hr	H.M. Kalaji
	Tutorial 2 Light sensors	2 hr	J.T. Puthur
	Tutorial 3 LAI meters and Leaf Tip Angles measurements	1 hr	H.M. Kalaji
Day 3	**Lecture 4** Pigments composition influencing plant productivity	1 hr	J.T. Puthur
	Lecture 5 Photosynthesis, respiration, transpiration, stomatal conductance influencing plant productivity	1 hr	J.T. Puthur
	Tutorial 4 Chlorophyll and flavonol measurements	2 hrs	J.T. Puthur
Day 4	**Lecture 6** Photosynthetic efficiency of photosynthesizing organisms – part 1	1 hr	H.M. Kalaji
	Lecture 7 Photosynthetic efficiency of photosynthesizing organisms – part 2	1 hr	H.M. Kalaji
	Tutorial 5 IRGA- Gas exchange measurements	2 hrs	H.M. Kalaji
Day 5	**Lecture 8** Plant productivity- Summarizing	1 hr	H.M. Kalaji
	Lecture 9 Chlorophyll fluorescence measurements – part 1	1 hr	H.M. Kalaji
	Tutorial 6 Hands on training - Chlorophyll fluorescence measurements and Plant productivity- Summarizing - Practices and calculations	2 hrs	H.M. Kalaji

An exam will be conducted at the end of the course based on which course grade sheet will be provided.

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GIAN COURSE REGISTRATION FORM
(1st April 2019 to 5th April 2019)

NAME	:	.....
DESIGNATION	:	.....
ORGANIZATION	:	.....
ADDRESS	:	.....
EMAIL ID	:	.....
MOBILE NO	:	.....
COURSE NAME	:	.....
		.....
ACCOMMODATION REQUIRED	:	Yes / No
FOOD HABITS	:	Veg / Non veg

TRANSACTION NO. (e-transfer/RTGS/NEFT):.....

DEMAND DRAFT NO. (If paid by Demand Draft):.....

Place:

Date:

Signature of the Applicant