



**Ph.D. course in: “CLIMATE CHANGE SCIENCE”**  
**University of Ghana**  
**25<sup>th</sup> February – 1<sup>st</sup> March 2019**

*Course Objective:* To provide participants with deeper understanding of the science of climate change, needs and best practice that could be implemented to build the resilience of the Ghanaian smallholder farmer. The focus will be on the causes and impact of climate change, future projections and possible solutions in the smallholder farming system in Ghana. The role climate and crop modelling in building resilience of the smallholder farmer will also be explored.

The course will be open to both Masters and PhD students within the relevant programs in order to provide the solid foundation for further thesis research on climate change adaptation and mitigation.

**Volume:** 80 hours including preparation, reading and reporting. Direct course work: 40 hours over 5 days, reading before: 20 hours, report work: 20 hours

**Target group:** PhD and Masters Students within *Agronomy, Biology, Environmental Science, Geography, Physics and other relevant areas.*

**Number of Participants:** maximum 25.

**DESCRIPTION OF THE COURSE:**

The course aims at giving the PhD student a thorough background to climate change science and modelling, including knowledge on the fundamental processes underlying climate change, and its potential impacts on the environment and agriculture. The course will include a combination of lectures and group work on chosen topics within climate science, climate and crop models. The practical and theoretical exercises and discussions will be conducted in groups. Each practical and theoretical exercise will result in a short exercise report from each student. These reports will make up the student's personal course portfolio, which will be evaluated after the course.

**LEARNING OUTCOMES AND COMPETENCES:**

After a successful completion of the course, student will be able to:

- Explain and quantitatively describe the main drivers and mechanisms of climate change.

- Explain the projections of climate change on a global scale and regionally with focus on Ghana.
- Explain downscaling of climate change projections
- Explain and analyse how climate change affects crops and cropping systems.
- Evaluate crop yield prediction under different climate change scenarios.

## **COURSE CONTENT**

**Days 1 & 2:** Drivers of the climate system, Greenhouse gas emissions, climate models, downscaling projections and weather generators, regional CC projections and their uncertainty.

**Days 3 & 4:** Crop Modelling: Theory on the model AquaCrop before noon and hands on exercises with this model in the afternoon. Focus on effects of current climate on crop development and crop production. Exercises on model setup based on fixed days and based on GDD (Growing degree-days). How to schedule irrigation.

**Day 5:** Crop Modelling. Theory on the model AquaCrop before noon and hands on exercises with this model in the afternoon. Focus on effects of future climate on crop development and crop production. Exercises on temperature and CO<sub>2</sub> effects on crop development and production.  
Course evaluation.

**Practical information:** We recommend that students bring a laptop, if possible. Spreadsheets and R software will be used for exercises. Students will also be required to produce a short report during the course, which will also require a computer.

## **TEACHERS AND THEIR AFFILIATION:**

- *University of Ghana:* Kwadwo Owusu | Christina Amoatey | Nana Ama Browne Klutse |
- *Aarhus University:* Finn Plauborg | Kirsten Kørup | Saghar Khodadad Motarjemi | Johannes Wilhelmus Maria Pullens

**Registration:** Kindly fill the attached Form and Email to Dr. Christiana Amoatey ([camoatey@ug.edu.gh](mailto:camoatey@ug.edu.gh)) or Dr. Nana Ama Browne Klutse ([nklutse@ug.edu.gh](mailto:nklutse@ug.edu.gh)), not later than **31<sup>st</sup> January, 2019**.