

Syllabus of “Climate Resilient Agriculture” course at AAU

Proposed OPTIONAL course under Dept. of Agricultural Biotechnology, Assam Agricultural University, Jorhat, October, 2019

Need of the course: This course has been proposed as a part of adaptation to the alarming issue of climate change and its impact on agriculture. The course has been designed as an interdisciplinary course including climate change mitigation strategies from various possible angles, within the scope of agricultural science. The proposal is also a part of the Erasmus plus programme entitled “**Strengthening education, research and innovation for climate smart crops in India** (AdaptNET) funded by the European Union and currently being operated under the DBT-AAU Centre since Nov 2018. The Assam Agricultural University is the co-coordinating institute of this programme and Agricultural University of Athens as the coordinating institute along with three other European institutes and three Indian institutes as collaborating organizations. The proposed course on “climate resilient agriculture” is mandatory under this programme. To run this course successfully, a group of 10 scientists/teachers from AAU has already followed a four-week training in Europe under AdaptNet programme and their training has been approved by AAU authority. They will be the master trainer for future trainee (PG and PhD students etc) through this E-course. The e-lab is being established under AdaptNet programme at DBT-AAU Centre / ABT building. The course content was presented in the Annual meeting of AdaptNet programme held at Hyderabad during Oct 2018 and approved by all partners.

The course will be offered as an ‘OPTIONAL POSTGRADUATE COURSE’ by the Dept of Agricultural Biotechnology and it will be open for students from all the departments of all the faculties.

Course Title: Climate Resilient Agriculture

Objective: To make the learners aware of the climate change issue with respect to its extent and impact. The learners will also acquire knowledge about various means to mitigate climate change impact on agriculture and allied sectors.

Credit hours: 3 (2+1)

Target Group/ level: Post Graduate

COURSE CONTENT

Theory

Module	Content
Module 1	Introduction to Climate Change Science: Basic concept of weather, climate, climate variability and climate change; Introduction to greenhouse effect (GHE), greenhouse gases (GHGs), global warming and global warming potential (GWP), Trends and fluctuations of major climatic parameters and associated environmental changes; Impact of climate change in agriculture.
Module 2	Modern Agriculture and Climate Change: Modern agricultural practices and sustainable production systems for food and nutritional security; Climate change

	scenarios in agriculture; Trends of agricultural production and productivity under the changing climatic scenarios including extreme events such as drought, flood, pest and disease outbreak etc.
Module 3	Climate Change Adaptation and Mitigation: Concept of climate change adaptation and mitigation in agriculture; analyzing and assessing climate vulnerability to identify vulnerable sectors and possible adaptation options on agriculture and allied sectors; assessing biophysical and socio-economic impacts across key sectors; risk assessment strategies, preparedness for weather and climate risks; application of geospatial techniques and crop modeling for sustainable management of natural resources.
Module 4	Climate Resilient Agriculture: Climate resilient agriculture (CRA) – concept, scope and importance; History of CRA; Climate smart technologies for enhancing crop productivity and sustainability – weather smart (weather forecasts, crop diversification), water smart (rain water harvesting, SRI, aquifer recharge), carbon smart (organic agriculture, conservative agriculture), nutrient and pest smart (Site Specific Nutrient Management, integrated farming systems, harnessing microbial biodiversity, ecological engineering), energy smart (biomass recycling, use of solar energy) and knowledge smart (ICTs, Smart phone Apps, crop simulation models) etc; concept of climate smart village, CRA with special reference to India, success stories of CRA
Module 5	Climate Smart Crop Development: Introduction to climate smart crops and their development; Strategies being adopted to develop climate smart crops; selection and evaluation of climate smart crop varieties; Biotechnological interventions and molecular genetics/ genomics based approaches for development of climate smart crops; Development of biotic and abiotic stress tolerant/resistant crops under changed climatic scenarios including extreme events.

Practical

- Acquaintance with meteorological instruments including AWS
- Statistical techniques to study trends and fluctuations of climatic parameters
- Study of the extent and impact of climate change in various local ecosystems using various parameters: (i) in agricultural field, ii) in wild ecosystem.
- Awareness programme on climate change and climate resilient agriculture among school children and farming community.
- Designing strategy to mitigate the effects of climate change using climate-smart crops, climate smart technologies and manipulation of cropping patterns etc.
- Building climate change scenarios under different futuristic emission of GHGs
- Climate change laboratory and simulation experiments.
- Designing of a ‘climate smart village’ model considering the availability of resources.