

## Continuing Education Available Courses Spring Courses: January 18 – May 10, 2022

To fully participate in our continuing education courses, students should have:

- High speed internet connection and updated browsers, including Internet Explorer and either Chrome or Firefox
- Common plug-ins (e.g. Adobe Reader, Flash Player, Virus Protection, Java, etc.)
- Speakers and Webcam with microphone
- Skype or Zoom
- Ability to either scan or fax course documents to the instructor

### Spring 2021

#### **Plant Breeding Fundamentals – Full Course (3 Units) – Cost \$679.65**

**January 18 - May 10, 2022**

Introduction to the field of plant breeding for students without a plant breeding background. Includes common plant breeding terminology and introduction of concepts. Genetic improvement of crops by hybridization and selection; special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated and asexually reproduced plants.

Instructor: Dr. Steve Hague - [shague@tamu.edu](mailto:shague@tamu.edu)

#### **Basic Plant Breeding - Full Course (3 Units) - Cost - \$679.65**

**January 18 - May 10, 2022**

Basic Plant Breeding can be taken as an entire course (all three units) or each unit can be taken individually. For participants in our Professional Certificate in Plant Breeding and Genetics, completion of all three units is required with a minimum score of 70% on the final exams for each unit.

*Unit 1 - Introduction to Basic Plant Breeding*                      *Cost - \$226.55*  
*January 18 – February 18, 2022*

Introduction to Basic Plant Breeding provides a review of plant reproduction, genetic variation, gene banks, germplasm preservation, gene segregation, the power of selection and its role in plant breeding, and an introduction to intellectual property and its role in the life of a plant breeder. This unit is designed to prepare the participant to explore the genetics and methodologies employed by plant breeders of self and cross pollinated crop species in units two and three of Basic Plant Breeding.

*Unit 2 - Breeding Self Pollinated Crops*                      *Cost - \$226.55*  
*February 21 – March 25, 2022*

The frequency of any specific heterozygous locus will be reduced by 50% for every generation of selfing, resulting in a mixture of homozygous lines within any natural population. Phenotypic selection within heterozygous generations will lead to homozygous or near homozygous germplasm lines or cultivars under self-pollination. This unit is designed to communicate plant breeding methodologies that take advantage of the genetic consequences of natural or forced self-pollination in agronomic crops. Topics will include: [1] the basics of segregation, [2] breeding methodologies, [3] the grain sorghum conversion program-an example of backcrossing in a different direction, [4] review of a commercial soybean cultivar development program, and [5] a review of the types of genetic releases from Texas A&M AgriLife Research.

*Unit 3 - Breeding Cross Pollinated Crops*                      *Cost - \$226.55*  
*March 28 – April 29, 2022*

Topics covered include: quantitative genetics and plant breeding, effects of selection on Hardy Weinberg Equilibrium, mating designs with cross pollinated crops, breeding methods for cross pollinated crops, deviations from Mendelian ratios, genetic male sterility and hybrid seed production, seed certification and types of release.

Recommended textbooks are “Breeding Field Crops” by J.M. Poehlman and D.A. Sleper, and “Principles of Cultivar Development” by W.F. Fehr. A final exam will allow the participant to assess their grasp of topics covered.

This is a "self-paced" course and is available for viewing for a limited time. Few outside assignments are made. Students should view each lecture, review all previous lectures and be prepared to discuss any issues that are unclear. Each unit has a printable note set and most have a set of review questions to help check your comprehension of unit concepts. Feel free to contact the instructor, Dr. Wayne Smith, [cwsmith@tamu.edu](mailto:cwsmith@tamu.edu) or 979-845-3450, with any questions you have or if you need additional information.

## **Analysis of Complex Genomes – Full Course (3 Units) – Cost - \$679.65**

**January 18 - May 10, 2022**

Genome structure, organization and function of model organisms and higher eukaryotes; theory and methodology of genetic and physical mapping, comparative genomics, sequencing, sequence analysis and annotation; emphasis on understanding the function of complex genomes, genome-wide expression analysis, genetic and epigenetic mechanisms; X-inactivation, imprinting, gene silencing, transposons, genome duplication and evaluation. Requires an in-depth and working knowledge of basic and advanced plant breeding concepts.

Instructor – Dr. Endang Septiningsih - [eseptiningsih@tamu.edu](mailto:eseptiningsih@tamu.edu)

## **Quantitative Genetics and Plant Breeding - Full Course (3 Units) - Cost - \$679.65**

**January 18-May 10, 2022**

Applied aspects of quantitative genetics in plant breeding; examination of methodologies to analyze quantitative variation in crop species; genetic phenomena (inbreeding, heterosis and epistasis); quantitative trait loci (QTL) mapping and marker-assisted selection (MAS); genotype by environment interaction, heritability multiple traits and selection theory with implications in plant breeding. Requires an in-depth and working knowledge of basic and advanced plant breeding concepts.

Instructor – Dr. Seth Murray - [sethmurray@tamu.edu](mailto:sethmurray@tamu.edu)

## **Experimental Designs in Agronomic Research - Full Course (3 Units) - Cost - \$679.65**

**January 18 – May 10, 2022**

Teaches fundamental principles and procedures of experimental designs in agricultural sciences. Emphasis includes factorial designs, predicting outputs, use of covariance, and balanced and unbalanced experimental designs as related to common agricultural research projects under field, greenhouse or growth chamber culture. Students become familiar with computer programming of common statistical software. Experimental Designs in Agronomic Research can be taken as an entire course (all three units) or each unit can be taken individually. For participants in our Professional Certificate in Plant Breeding and Genetics, completion of all three units is required.

### *Unit 1 - Factorial Experimental Designs in Agronomic Research*

*January 19 – February 18, 2022*

Topics covered include: Fundamentals of agricultural research methodology and methodology, basic statistical concepts for testing of hypothesis, introduction to simple computer statistical software programs and applications, complete randomized design, randomized complete block design, and Latin square design.

Cost - \$226.55

### *Unit 2 - Factorial and Unbalanced Designs in Agronomic Research*

*February 21 – March 25, 2022*

Topics covered include: Split-plot and split-split plot designs, nested designs, variance analyses, interactions with years and locations, comparisons of paired and grouped mean, estimation of missing values, the general linear model, and planned incomplete block design.

Cost - \$226.55

### *Unit 3 - Correlation, Regression, Covariance, and Biplot Analysis in Agronomic Research*

*March 28 – April 29, 2022*

Topics covered include: Correlation, regression, path coefficient analysis, covariance analysis, nearest neighbor analysis, augmented designs and moving means and analysis, database management, biplot analyses.

Cost - \$226.55

Instructor – Dr. Amir Ibrahim

## **Introduction to Host Plant Resistance (1 Unit) - Cost - \$226.55**

**January 18 – February 18, 2022**

Host plant resistance programs from the standpoint of the plant breeder.

Instructor – Dr. Wayne Smith - [cwsmith@tamu.edu](mailto:cwsmith@tamu.edu)