Plant Breeding
2 FIGHT HUNGER

ONLINE CERTIFICATE COURSE

Plant breeding: the art and science of crop improvement

To feed an additional three billion people by 2050, food production needs to double—while using less land, water and other resources. The way forward? To improve crops so that they are resilient to climate change with resistance to biotic and abiotic stresses.

To achieve this goal, we need a well-trained workforce, equipped with a sound knowledge of the plant breeding process and the technologies that improve its efficiency. But a 2016 study by USDA and Purdue University points to an alarming deficit of trained graduates in the U.S., particularly in the critical field of plant breeding. The situation is no better globally, specifically in Asia and Africa, where the coming population increase will be highest.

Our Goal:
plant breeders without borders.

This course will focus on conventional and modern plant breeding methods, tools and technologies available for crop improvement.

If you want to...

- Fight global hunger
- Teach plant breeding
- Work at a seed company (or already work at a seed company)
- Start a public or private sector plant breeding program
- Improve the efficiency of your plant breeding program
- Research crop improvement
- Add a plant breeding qualification to your resume
- Start a plant breeding career

...this course is for you!

WHEN: January 12 – April 26, 2026
WHERE: Online
COST: $600 [public sector]
$1200 [private sector]

APPLICATION DEADLINE
JANUARY 1, 2026

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COURSE TOPICS

WEEK 1: History of plant breeding and crop domestication

WEEK 2: The plant breeding process

WEEK 3: How traits are inherited – Part I: Mendelian genetics and Chi-square statistics

WEEK 4: Experimental design and heritability calculations

WEEK 5: Reproduction in plants and impacts on plant breeding

WEEK 6: Methods for breeding self-pollinated and cross-pollinated crops

WEEK 7: How traits are inherited – Part II: Non-Mendelian genetics

WEEK 8: Review of genetic linkage/mapping

WEEK 9: Basic molecular biology techniques and marker-assisted breeding (MAB) applications

WEEK 10: Developing markers for qualitative and quantitative traits

WEEK 11: Genetic engineering as a plant breeding tool

WEEK 12: Regulatory approvals needed for testing and releasing genetically engineered crops to farmers

WEEK 13: Use of gene editing and new breeding tools (NBTs)

WEEK 14: Overview of genomics, phenomics, machine learning and artificial intelligence in crop improvement

CONTACT

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