





# A practical approach for breeding stress tolerance crops



by Visiting Associate Professor **Mostafa Abdelrahman**  
 from Texas Tech University, USA  
 hosted at the Lab. of Plant Breeding  
 Division of Agronomy and Horticultural Science  
 E-mail: mosabdel@ttu.edu

  **8:45 am – 2:45 pm, Tue, Jan 21<sup>st</sup> & Thu, Jan 23<sup>rd</sup> @W420**  
**1:15 pm – 4:30 pm, Wed, Jan 22<sup>nd</sup> @W420**

## Course Summary

This course offers a comprehensive exploration of microbiome science, with a special focus on plant-microbiome interactions. It is designed to introduce students to the fundamental concepts of microbiome research, the rapidly evolving field of metagenomics, and the critical role microbes play in shaping plant health, productivity, and resilience. Throughout the course, students will engage in the theoretical and practical aspects of microbiome studies, gaining skills in (i) the fundamental concepts of microbiome research and metagenomics, including the methods used to analyze microbial communities, (ii) Analyze the interaction between plants and their associated microbial communities, including the mechanisms by which plants modulate and benefit from these interactions, (iii) Develop the skills needed to process, analyze, and interpret microbiome sequencing data using bioinformatics tools, (iv) Apply microbiome research principles to real-world problems, particularly in agriculture, to enhance crop growth, stress tolerance, and disease resistance, (v) Critically assess the latest research and developments in the field of microbiome science and its application in plant biology.

*This course will be given in English and is open to students in any division.*

## Course Schedule

The schedule may change slightly depending on the progress.

Period and Date	Contents	Period and Date	Contents
1 <sup>st</sup> , Tue, Jan 21 <sup>st</sup> , 2025	Introduction to Microbiome and Metagenomics	4 <sup>th</sup> , Wed, Jan 22 <sup>nd</sup> , 2025	Diversity Analysis, Including Alpha and Beta Diversity
2 <sup>nd</sup> , Tue, Jan 21 <sup>st</sup> , 2025	Plant-Microbiome Interactions	1 <sup>st</sup> , Thu, Jan 23 <sup>rd</sup> , 2025	Functional Profiling and Microbial Networks
3 <sup>rd</sup> , Tue, Jan 21 <sup>st</sup> , 2025	Data Analysis in Microbiome Studies Using DADA2 R	2 <sup>nd</sup> , Thu, Jan 23 <sup>rd</sup> , 2025	Case Studies and Applications
3 <sup>rd</sup> , Wed, Jan 22 <sup>nd</sup> , 2025	Data Acquisition and Processing	3 <sup>rd</sup> , Thu, Jan 23 <sup>rd</sup> , 2025	Feedback

