BIOLOGY 380.3
Project Proposal Form

Student's name:_____ **Signature:** _____

Student number:_____ **NSID**: _____

Proposed Supervisor: Byung-Kook (Brian) Ham **Signature:** _____

Course & CRN#: _____BIOL380.3_____ **Term:** 2024 Fall

Proposed Project Title: Phenotypic analyses of plant root development in response to the imposed mineral element-starvation

Project Outline: Please provide a brief outline of the proposed research project. Include any relevant methodology and explain what the student will learn over the course of the project (attach additional pages if necessary).

Nitrogen (N), phosphorus (P) and potassium (K) are essential macronutrients for plant growth and main constituents of fertilizers that drive sustainable agricultural output. However, fertilizer run-off and N fertilizer production can cause various problems, e.g. eutrophication, greenhouse gas emissions, in our bioecosystem, thus, to achieve the environmentally sustainable agriculture, it is essential for crop engineering to develop elite lines with both enhanced mineral element uptake and use efficiency.

In the BIOL380, students will have research experience to analyze plant developmental phenotypes in Arabidopsis, canola and cucumbers, including root morphological changes, agronomic traits (seed yield, growth performance, resilience to abiotic/biotic stresses, etc.), under various mineral element-starvation conditions in environmentally controlled chambers and greenhouse. Meanwhile, students will enhance their understanding of knowledge in molecular biology, genetics, and cell biology.

Students will be required to perform at least 6 hours per week for this project throughout the 2024 Fall term. A maximum of 2 students can be accommodated on this course.

Please, contact Prof. Dr. Byung-Kook (Brian) Ham for more information.

Prerequisites: Completion of 12 credit units of senior BIOL courses.

Evaluation: Please indicate when grades will be assigned. Will anyone other than the proposed supervisor be providing any assessment?

Assessment Metric:	**Date(s) Grade is to be Assigned:**
Practical Research Performance (25%)	12% Oct 11, 13% Dec 5
Research Notebook (25%)	10% Oct 29, 15% Dec 5
Literature Review/Final report (40%)	5% annotated bibliography (2.5% Oct 11 and 2.5% Dec 5), 10% background literature review (5% Oct 11, 5% Dec 5), 25% Term paper by Dec 5
Oral Presentation (10%)	To be determined, but before Dec 5
Total (100%)	

A copy of the final literature review is to be provided to the Department. The original Research Notebook may be retained by the Course Supervisor depending on intellectual property requirements.

Approved:_____ Date:_____

(Department Head)