PURDUE UNIVERSITY | College of Engineering

Engineering Faculty Document
No.: EFD 55-23
October 28, 2022

**TO**: The Engineering Faculty

**FROM**: The Faculty of the Agricultural and Biological Engineering Department

**RE**: New graduate course – ABE 54700 – Models and Microbiomes

The Faculty of the Agricultural and Biological Engineering Department has approved the following new graduate course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

**FROM** (IF ALREADY OFFERED WITH TEMPORARY NUMBER)**: ABE 59100**

Fall; 3 total credits; Lecture

Restricted to seniors and graduate students

Fall 2021 (6) and 2022 (11)

**TO: ABE 54700 – Models and Microbiomes**

Fall; 3 total credits; LEC/170/1/16

Restricted to seniors and graduate students

Determine the use of computational, physical, and biological models for studying and engineering microbiomes. Study peer-reviewed literature and synthesize findings in the form of oral and written deliverables. Background in microbiology either from coursework or research and interest in microbiomes recommended.

**RATIONALE:**

The course has been offered in Fall 2021 and Fall 2022 as ABE 59100 and had an enrollment of 6 and 11 respectively. This request is to convert it to a permanent course number for future offerings. This course provides an overview of computational, physical, and biological modeling tools available for studying and engineering microbiomes. This knowledge will help the learners apply such tools to their own work. It also develops oral and written communication skills. The target audience is graduate students and senior undergraduate students.

Nathan Mosier, Head of the Agricultural and Biological Engineering Department

Link to Curriculog entry: **https://purdue.curriculog.com/proposal:22076/form**

# 1. Course Information

**ABE 59100 – Fall 2022**

**Models and Microbiomes**

CRN: 26586

Meeting day and times:

Mondays 3:30 – 6:20 pm: ABE 1164

In case of online sessions: https://purdue-edu.zoom.us/j/2454930300

Instructional Modality: Face-to-Face

Course credit hours: 3.00

Course Brightspace page: Fall 2022 ABE 59100-042 LEC

Prerequisites: At least Senior (undergrad) or Graduate student.

# 2. Instructor Contact Information

Instructor: Prof. Mohit Verma

Office: ABE 3016

Phone: 765-496-3687

E-mail: msverma@purdue.edu [best mode of contact]

Office hours: On-demand via Zoom (https://purdue-edu.zoom.us/j/2454930300). Request appointment by e-mail (msverma@purdue.edu) at least 72 hours in advance.

# 3. Course Description

Credit Hours: 3.00

Determine the use of computational, physical, and biological models for studying and engineering microbiomes. Study peer-reviewed literature and synthesize findings in the form of oral and written deliverables. Background in microbiology either from coursework or research and interest in microbiomes recommended.

Typically offered: Fall

# 4. Learning Resources, Technology & Texts

Required text: none

Additional resources: will be posted on Brightspace as needed.

Software/web resources:

- Hotseat: In-class participation and discussion will be via Hotseat (https://www.openhotseat.org/). Please ensure that you have a compatible device with you during class times.
- Brightspace: All presentations and reports will be submitted via Brightspace.

Class notes: will be posted on Brightspace

Recorded lectures: will be available on Brightspace via Kaltura Media Gallery (BoilerCast)

## 5. Learning Outcomes

Successful completion of the course will enable the students to:

1. Review primary papers and books for state-of-the-art developments in the field of microbiome.
2. Analyze the relationships between multiple modeling approaches for the microbiome.

## 6. Deliverables

Your learning will be assessed through three presentations and a report. Details on these deliverables will be posted on Brightspace. An overview of grading is provided below

| DELIVERABLE | DUE | PERCENT WEIGHT (%) |
|---|---|---|
| Presentation I | September 19 | 25 |
| Presentation II | October 17 | 25 |
| Presentation III | November 14 | 25 |
| Final Report | December 5 | 25 |
| | | Total: 100 |

**Presentations (75%)**

The purpose of the oral presentations is to determine how each module is relevant to your chosen microbiome of interest.

**Report (25%)**

The purpose of the report is to analyze the relationships between different types of modeling approaches and highlight the missing gaps.

Late submissions will not be accepted.

## 7. Grading Scale

| | |
|---|---|
| > 97.0% | $A^+$ |
| 92.5 – 96.9 % | A |
| 90.0 - 92.4% | $A^-$ |
| 87.5-89.9% | $B^+$ |
| 82.5-87.4% | B |
| 80.0-82.5% | $B^-$ |
| 77.5-79.9% | $C^+$ |
| 72.5-77.4% | C |
| 70.0-72.4% | $C^-$ |
| 67.5-69.9% | $D^+$ |
| 62.5-67.4% | D |
| 60.0-62.4% | $D^-$ |
| < 60% | F |

## 8. Course Schedule (tentative*)

| Week | Date | Topic |
|---|---|---|
| 1 | August 22 | Introduction to microbiomes and communication approaches |
| 2 | August 29 | Module 1: Types of computational models (dynamic models) |
| 3 | September 5 | *Labor day – no class* |
| 4 | September 12 | Module 1: Spatiotemporal models |
| **5** | **September 19** | **Module 1 (Computational models) – Presentation** |
| 6 | September 26 | Module 2: Types of physical models (Synthetic microbial ecology) |
| 7 | October 3 | Module 2: *In vitro* host-microbiome interactions |
| 8 | October 10 | *October break – no class* |
| **9** | **October 17** | **Module 2 – (Physical models) Presentation** |
| 10 | October 24 | Module 3: Types of biological models (simple animal models) |

| | | |
|---|---|---|
| 11 | October 31 | Module 3: Mammalian animal models. |
| 12 | November 7 | Module 3: Integrated approaches to models |
| **13** | **November 14** | **Module 3 – (Biological models) Presentation** |
| 14 | November 21 | *Thanksgiving week – no class* |
| 15 | November 28 | Tentative: Examples of grant/review paper proposals |
| **16** | **December 5** | **Final report due** |

* Schedule and assignments subject to change. Any changes will be posted in the learning management system.

## 9. Academic Guidance in the Event a Student is Quarantined/Isolated

If you become quarantined or isolated at any point in time during the semester, in addition to support from the Protect Purdue Health Center, you will also have access to an Academic Case Manager who can provide you academic support during this time. Your Academic Case Manager can be reached at acmq@purdue.edu and will provide you with general guidelines/resources around communicating with your instructors, be available for academic support, and offer suggestions for how to be successful when learning remotely. Importantly, if you find yourself too sick to progress in the course, notify your academic case manager and notify me via email. We will make arrangements based on your particular situation. The Office of the Dean of Students (odos@purdue.edu) is also available to support you should this situation occur.

## 10. Attendance Policy during COVID-19

Students should stay home and contact the Protect Purdue Health Center (496-INFO) if they feel ill, have any symptoms associated with COVID-19, or suspect they have been exposed to the virus. In the current context of COVID-19, in-person attendance will not be a factor in the final grades, but the student still needs to inform the instructor of any conflict that can be anticipated and will affect the submission of an assignment or the ability to take an exam. Only the instructor can excuse a student from a course requirement or responsibility. When conflicts can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency conflict, when advance notification to an instructor is not possible, the student should contact the instructor as soon as possible by email. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because

of circumstances beyond the student's control, and in cases of bereavement, quarantine, or isolation, the student or the student's representative should contact the Office of the Dean of Students via email or phone at 765-494-1747. Our course Brightspace includes a link on Attendance and Grief Absence policies under the University Policies menu.

## 11. Classroom Guidance Regarding Protect Purdue

Any student who has substantial reason to believe that another person is threatening the safety of others by not complying with Protect Purdue protocols is encouraged to report the behavior to and discuss the next steps with their instructor. Students also have the option of reporting the behavior to the Office of the Student Rights and Responsibilities. See also Purdue University Bill of Student Rights and the Violent Behavior Policy under University Resources in Brightspace.

## 12. Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information is submitted the greater the opportunity for the university to investigate the concern. More details are available on our course Brightspace table of contents, under University Policies.

All students are expected to perform with the highest academic integrity, thus it is required that any use of ideas, data, figures, or any form of intellectual property must be acknowledged. All references used in the preparation of reports should be included in a complete list of references. Although co-operation among students is encouraged, copying of homework, reports and exams will not be tolerated. Everyone must complete their own homework. Note that this does not preclude discussion of pertinent ideas with others and with the instructors, for example during office hours.

Incidents of academic misconduct in this course will be addressed by the course instructor and referred to the Office of Student Rights and Responsibilities (OSRR) for review at the university level. Any violation of course policies as it relates to academic integrity will result minimally in a failing or zero grade for that particular assignment, and at the instructor's discretion may result in a failing grade for the course. In addition, all incidents of academic misconduct will be forwarded to OSRR, where university penalties, including removal from the university, may be considered.

**PURDUE'S HONOR PLEDGE**

As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue

https://www.purdue.edu/provost/teachinglearning/honor-pledge.html

## 13. Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. More details are available on our course Brightspace table of contents, under University Policies.

## 14. Accessibility

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247. More details are available on our course Brightspace under Accessibility Information.

## 15. Mental Health/Wellness Statement

**If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack.** Sign in and find information and tools at your fingertips, available to you at any time.

**If you need support and information about options and resources**, please contact or see the Office of the Dean of Students. Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

**If you find yourself struggling to find a healthy balance between academics, social life, stress**, etc. sign up for free one-on-one virtual or in-person sessions with a Purdue Wellness Coach at RecWell. Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect. If you have any questions, please contact Purdue Wellness at evans240@purdue.edu.

**If you're struggling and need mental health services**: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 during and after hours, on weekends and holidays, or by going to

the CAPS office of the second floor of the Purdue University Student Health Center (PUSH) during business hours.

## 16. Basic Needs Security

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency assistance from the Critical Needs Fund

## 17. Emergency Preparation

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email and check Brightspace on a frequent basis