Introduction

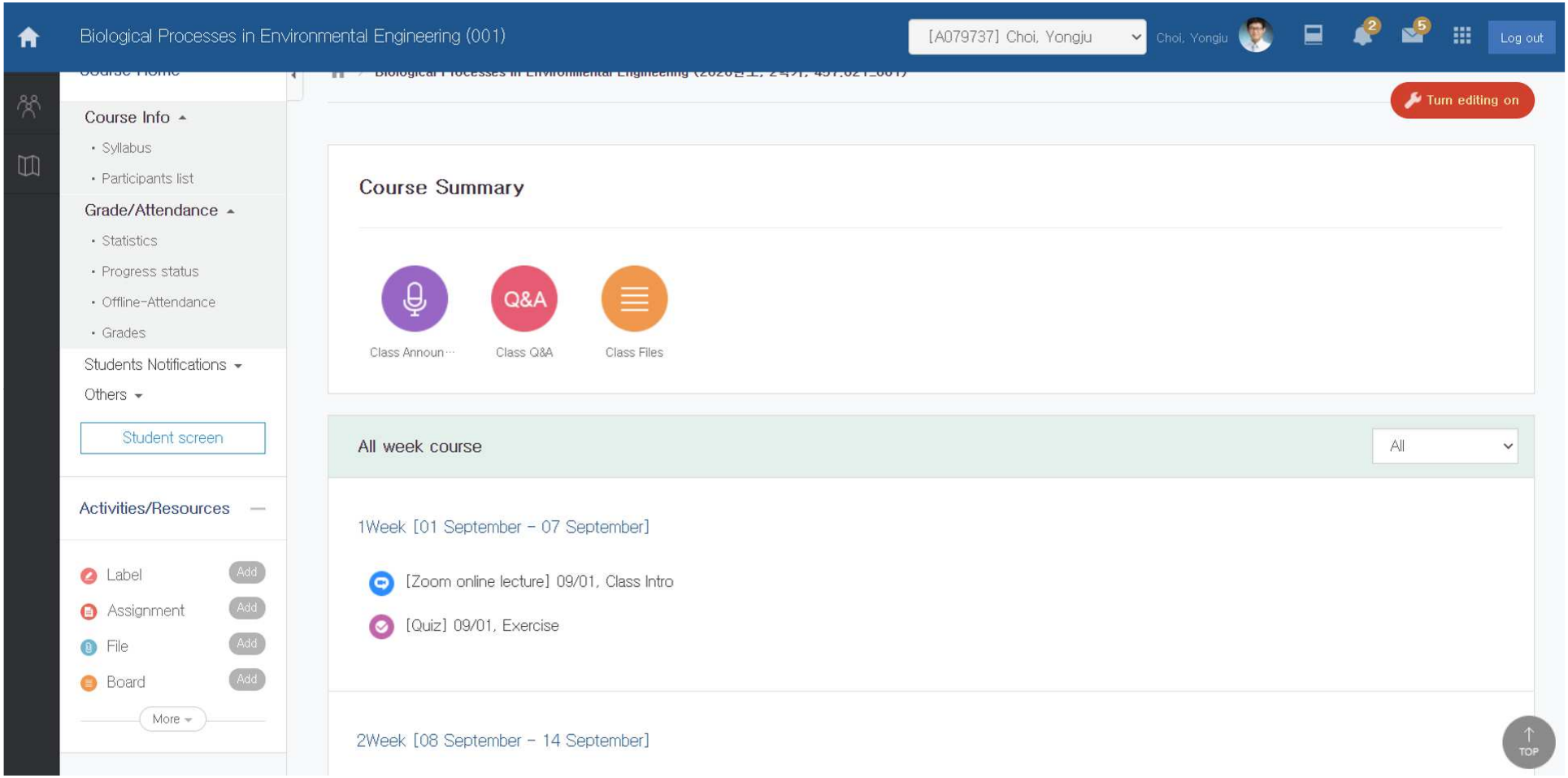
Biological Processes in Environmental Eng.

- Office hour: by appointment, 35-307
- Email: ychoi81@snu.ac.kr
- Course material/textbook:

  1. Lecture notes
  2. Rittmann & McCarty, Environmental Biotechnology: Principles and Applications

Course plan – general

- 100% online (except for final exam – **Nov 26, Thu**)
- Regular lectures: recorded video clips + online quiz
- Student presentation & discussion: Zoom
- Almost all information, materials (including HW), & links will be exchanged via eTL
- Online quiz: via eTL, **11:00 – 11:15 AM every class day** unless announced otherwise
  - Failure to participate in a quiz will be regarded as being absent for a class!
- **Check the eTL online classroom often!**


Biological Processes in Environmental Engineering (001)
[A079737] Choi, Yongju
Choi, Yongju
Log out
Turn editing on
Course Info
Syllabus
Participants list
Grade/Attendance
Statistics
Progress status
Offline-Attendance
Grades
Students Notifications
Others
Student screen
Activities/Resources
Label
Assignment
File
Board
Add
More
Course Summary
Class Announ···
Class Q&A
Class Files
All week course
All
1Week [01 September - 07 September]
[Zoom online lecture] 09/01, Class Intro
[Quiz] 09/01, Exercise
2Week [08 September - 14 September]
TOP

Student presentation & paper discussion

- Only one exam for this class? But…
- One of the student leads the class
- Topic & paper selection & posting
  - Select a topic & a paper (relevant to the class!) and submit a brief presentation plan to me at least **3 business days prior to the class assigned** (Tue class → Thu; Thu class → Mon)
  - Post the paper link to eTL at least **2 business days prior to the class assigned**

    (Tue class → Fri; Thu class → Tue)

Student presentation & paper discussion

- Contents
  - General introduction on the selected topic
  - Not a simple summary but a critical review of the selected paper
  - Consider how to facilitate discussion among students!
    - e.g., provide ≥3 points you would like to discuss
  - Presentation (15 min) + Discussion (10+ min)

Class objectives

- Understand the scientific principles related to the application of biological approaches for the management of water, soil, and solid waste.
- Obtain in-depth knowledge on the biological approaches applied for environmental engineering (with a focus on wastewater management), study current issues of research, and discuss the future direction of research and applications.

Application of biological processes

- Usually to exploit microorganisms' capability of enzymatic transformation of chemicals
- Natural systems vs. engineered systems
  - (natural) self-purification of rivers, natural attenuation of soil contaminants, etc.
  - (engineered) bioreactors
- Bioreactors
  - provide a controlled environment for the growth and maintenance of complex, self-assembled microbial communities that perform ecologically critical functions

"Do what microorganisms want such that we can get what we want"

Application of biological processes

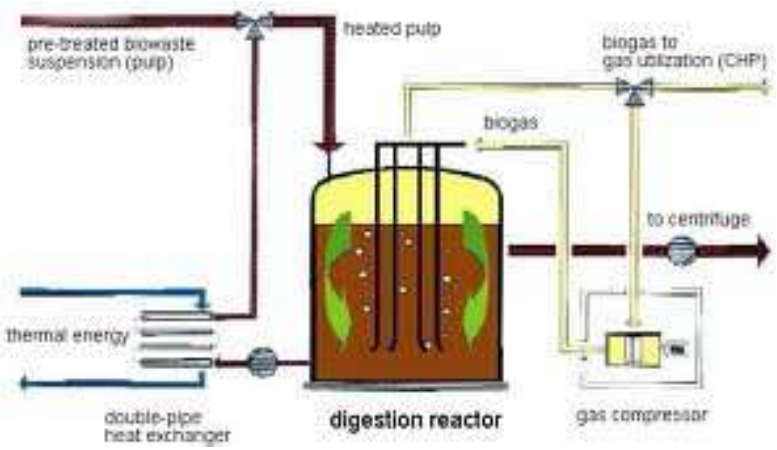
- Wastewater treatment – secondary treatment

activated sludge

trickling filter

Application of biological processes

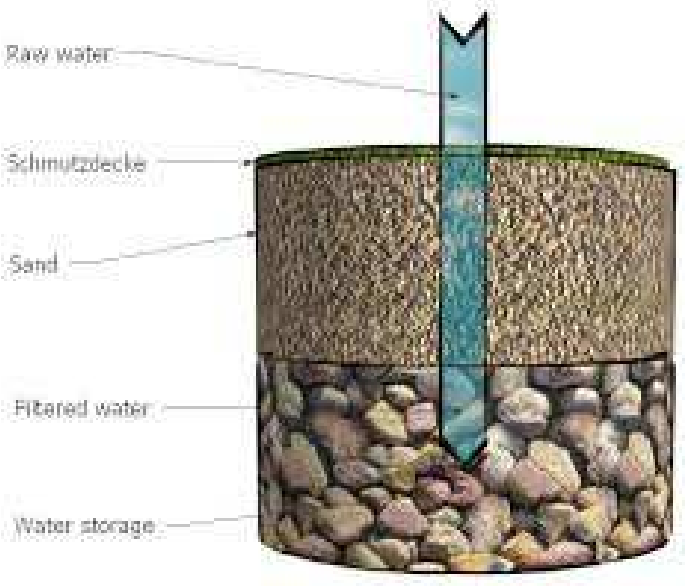
- Wastewater treatment – sludge treatment



anaerobic digestion

Application of biological processes

- Drinking water treatment



slow sand filtration

biological AC treatment

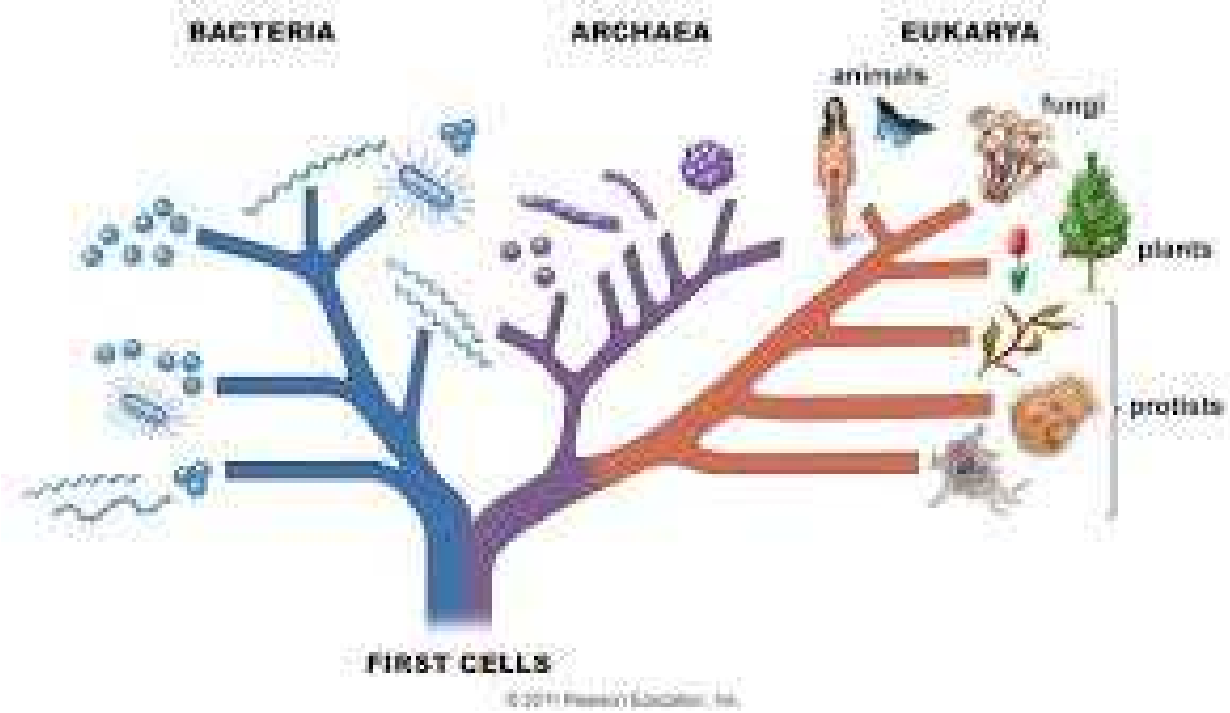
Application of biological processes

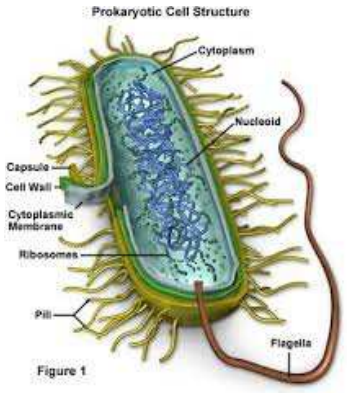
- Soil and groundwater treatment

landfarming

biostimulation

The main player





bacteria