

Modern Mathematics Seminar(Capstone Design)

Course Name	Course type (credit/hours)	Elective course(3/3)	Course code	G021
	Target students Division/major/grade	Mathematics/Senior	Opening semester	2018 1ST SEMESTER
	Class time and classroom	Wed D(Pal311)Fri D(Pal311)	English Grade	A(100%English)
Reference to this course	Prerequisite courses			
	Related basic courses			
	Recommended concurrent courses			
	Related advanced courses			

Instructor	Name (title/division)		Jae-Hun Jung(Professor, Dept. of Data Science)			
	Office Room Number	팔달관 1003-1	Office phone Number	2563	e-mail	
	Office hours			Homepage address		
Teaching Assistant	Name (title/division)					
	Office Room Number		Office phone Number		e-mail	

1. Introduction

Mathematical biology is one of the most rapidly growing branches of applied mathematics and has been proved very useful in explaining various biological and social phenomena (<http://www.ams.org/notices/201510/rnotip1172.pdf>). This course will provide a brief survey of recent progress in mathematical biology and related methods and offer an opportunity for students to conduct their own research project in this field.

This course is composed of two parts. The first part will focus on mathematical modeling of biological and social problems and introduce briefly related mathematical methods. Students will implement these methods using a computer programming language such as Python (a brief introduction to Python Programming will be provided). In the second part, students will choose their own research subject and conduct a small research either as an individual or a group.

2. Course Objectives

This course will provide a brief survey of recent progress in mathematical biology and related methods and offer an opportunity for students to conduct their own research project in this field.

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3. Class types and activities

The first part of this class will be composed of lectures covering theoretical approaches to Math Bio. The second part of the course will focus on the individual research project. Students' participation is a key element of the class. Students are encouraged to participate in the class in various forms.

4. Teaching Method

☒ lecture

☒ discussion and debate

☒ team project(presentation and case studies)

☐ experiments(role-playing,etc)

☐ designing and production

☐ on-site learning(on-site training)

☐ others

5. Support Systems in Use

☒ AjouBb

☐ automatic recording system

☒ web-based assignment

☐ cyber lecture

☐ online content

☐ class behavior analyzing system

☐ others

6. Teaching Tools

<input checked="" type="checkbox"/> PBL(Problem Based Learning)	<input checked="" type="checkbox"/> CBL(Case Based Learning)	<input checked="" type="checkbox"/> TBL(Team Based Learning)
<input checked="" type="checkbox"/> UR(Undergraduate Research)	<input type="checkbox"/> FL(Flipped Learning)	<input type="checkbox"/> DSAL(Data Science Active Learning)
<input type="checkbox"/> others		

7. Knowledge and ability required for taking this course

Students will use programming language such as Python. In addition to Python, basic mathematics background will be also asked such as Calculus, differential equations, linear algebra, etc.

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance			
midterm exam			
final exam			
quiz			
presentation			
discussion			
homework			
etc			
study hours			

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Main	References: 1. A Course in Mathematical Biology: Quantitative Modeling with Mathematical & Computational Methods,	G. de Vries et al.	SIAM	2006

10. Class system and Class shedule

Part 1: Mathematical methods; Part II: Individual or Group Project
Tentative schedule: Discrete-time models, ODE and PDE models, Stochastic and chaotic models, Uncertainty quantification/Parameter estimation, Pattern formation, Medical imaging, Network theory, Topological data analysis, etc.

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Part 1 – Math Biology		Jae-Hun Jung			
2	Part 2 – Indepenent Study		Jae-Hun Jung			

11. Other items of notification