2021학년도 1학기 강의계획안

교과목명 Course Title	Scientific Computing	학수번호-분반 Course No.	G10523-01
개설전공 Department/Major	Mathematics	학점/시간 Credit/Hours	3/3
수업 시간/강의실 Class Time/room	Wednesday, 12:30~3:30. SciComplex A315		
담당교원 Instructor	Name: June-Yub Lee	Department: Mathematics	
	E-mail: jyllee@ewha.ac.kr	Office Phone: 02-3277-3451	
면담 시간/장소 Office Hour/room	Mon 2PM at SciComplex A324 OR appointment by e-mail		

Ⅰ. 교과목 정보 Course Overview

1. 교과목 개요 Course Description

We try to develop computational models for various problems in mathematics, sciences, and engineering. We study numerical methods and programming tools to get the computational results of such problems.

2. 선수학습사항 Prerequisites

Ordinary differential equation. Numeral methods. (Preferred but required)
Matlab or any other programming language skill. (Preferred but required)

3. 강의방식 Course Format

강의 Lecture	발표/토론 Discussion/Presentation	실험/실습 Experiment/Practicum	현장실습 Field Study	기타 Other
40 %	30 %	30 %		%

(위 항목은 실제 강의방식에 맞추어 변경 가능합니다.)

강의 진행 방식 설명 (explanation of course format):
- 프로그래밍 실습과 토의/발표를 위해 가급적 대면으로 하되 필요시 실시간 zoom으로 연결
- Classroom lecture for numerical programming exercises but online lecture via 'zoom' if enforced by the authorities.

4. 교과목표 Course Objectives

We study design and implementation issues of scientific programs. Efficient algorithms and program design methods will be discussed in the viewpoints of efficiency, reliability, and portability for numerical simulations of physical, biological, chemical system.

5. 학습평가방식 Evaluation System

중간고사 Midterm Exam	기말고사 Final Exam	퀴즈 Quizzes	발표 Presentation	프로젝트 Projects	과제물 Assignments	참여도 Participation	기타 Other
%	%	%	30 %	40 %	30 %	%	%

(위 항목은 실제 학습평가방식에 맞추어 변경 가능합니다.)

*그룹 프로젝트 수행 시 팀원평가(PEER EVALUATION)이 평가항목에 포함됨. Evaluation of group projects may include peer evaluations.

평가방식 설명 (explanation of evaluation system):

- **Homework** : Programming in any language (Matlab, python, Fortran, C/C++)
- **Computational Project** : A report with program and documentation
- **Final Project** : Individual (or team) project of your own choice

Ⅱ. 교재 및 참고문헌 Course Materials and Additional Readings

1. 주교재 Required Materials

Walter Gander, Jiri Hrebicek, **Solving Problems in Scientific Compututing using Maple and Matlab**, 2nd Ed, Springer. (4th/2004)

2. 부교재 Supplementary Materials

Ke Chen, Peter Giblin, Alan Irving, **Mathematical explorations with Matlab,** Cambridge University Press, 1999.

Richard E. Crandall, **Projects in scientific computation**, Springer-Verlag, The Electronic Library of Science(TELOS), New York, 1994
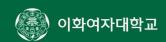
Stenen Koonin, **Computational Physics**, The Benjamin/Cummings Pub.

3. 참고문헌 Optional Additional Readings

Ⅲ. 수업운영규정 Course Policies

* 실험, 실습실 진행 교과목 수강생은 본교에서 진행되는 법정 '실험실안전교육(온라인과정)'을 필수로 이수하여야 함.
* For laboratory courses, all students are required to complete lab safety training.

IV. 차시별 강의계획 Course Schedule (최소 15주차 강의)

주차	날짜	주요강의내용 및 자료, 과제(Topics & Class Materials, Assignments)			
Weeks	Dates	Topic	Text Book Chapters	Pages	Notice
1-3	3/3(W) ~ 3/17(W)	Ordinary differential equation	1. The Tractrix and Similar Curves	1-14	
4-5	3/24(W) ~ 3/31(W)	Numerical differentiation and optimization	3. The Illumination Problem	25-36	
6-7	4/7(W) ~ 4/14(W)	2nd order elliptic partial differential equation	5. The Internal Field in Semiconductors	59-68	
8-9	4/21(W) ~ 4/28(W)	Least square method	6. Some Least Squares Problems	69-87	
		Individual Project	Choice of topic	<발표>	
10	5/5(W)	Computational Project	Any of above	<과제>	5/5(W)
11-13	5/12(W) ~ 5/26(W)	Denoising signals	9. Smoothing Filters	121-140	5/19(W)
		Individual Project	Model and algorithm	<토의>	
14-15	6/2(W) ~ 6/9(W)	Individual Project	Implementation issues	<토의>	
16	6/16(W)	Individual Project	Final presentation	<발표>	

Ⅴ. 참고사항 Special Accommodations

* 장애학생은 학칙 제57조의3에 따라, 학기 첫 주에 교과목 담당교수와의 면담을 통해 출석, 강의, 과제 및 시험에 관한 교수학습지원 사항을 요청할 수 있으며, 요청한 사항에 대해 담당교수 또는 장애학생지원센터를 통해 지원받을 수 있습니다. 강의, 과제 및 평가 부분에 있어 가능한 지원 유형의 예는 아래와 같습니다.

강의 관련	과제 관련	평가 관련
· 시각장애 : 점자, 확대자료 제공 · 청각장애 : 대필도우미 배치 · 지체장애 : 휠체어 접근이 가능한 강의실 제공, 대필도우미 배치	제출일 연장, 대체과제 제공	· 시각장애 : 점자, 음성 시험지 제공, 시험시간 연장, 대필도우미 배치 · 청각장애 : 구술시험은 서면평가로 실시 · 지체장애 : 시험시간 연장, 대필도우미 배치

- 실제 지원 내용은 강의 특성에 따라 달라질 수 있습니다.

* According to the University regulation section #57-3, students with disabilities can request for special accommodations related to attendance, lectures, assignments, or tests by contacting the course professor at the beginning of semester. Based on the nature of the students' request, students can receive support for such accommodations from the course professor or from the Support Center for Students with Disabilities (SCSD). Please refer to the below examples of the types of support available in the lectures, assignments, and evaluations.

Lecture	Assignments	Evaluation
· Visual impairment : braille, enlarged reading materials · Hearing impairment : note-taking assistant · Physical impairment : access to classroom, note-taking assistant	Extra days for submission, alternative assignments	· Visual impairment : braille examination paper, examination with voice support, longer examination hours, note-taking assistant · Hearing impairment : written examination instead of oral · Physical impairment : longer examination hours, note-taking assistant

- Actual support may vary depending on the course.

* 강의계획안의 내용은 추후 변경될 수 있습니다.
* The contents of this syllabus are not final—they may be updated.