

Course Syllabus

MEC 317: Mechanical Engineering Laboratory II Spring 2018

Course Detail

Title	MEC 317: Mechanical Engineering Laboratory II
Credit	2
Location	Lectures and Labs: C605 (Solids Section), C606 (Fluids Section)
Meeting Times	Lecture: 2:00 – 2:53 PM, Mon; Lab: 2:00 AM – 4:50 PM, Wen Spring 2018
Prerequisites	MEC 316, MEC 364
Co-requisites	MEC 300, MEC 305
Website	https://sites.google.com/site/AminFakhariSUNYK/teaching/mec317

Instructor Detail (Solids Section)

Instructor	Amin Fakhari, Ph.D.
Office	B620 Academic Building
Office Hours	Wed & Thu: 2:30-4:00 PM (and any other time by appointment)
Phone	+82-32-626-1816
Email	amin.fakhari@stonybrook.edu, amin.fakhari@sunykorea.ac.kr
Website	https://sites.google.com/site/AminFakhariSUNYK

Instructor Detail (Fluids Section)

Instructor	Si Won Hwang, Ph.D.
Office	A405 Academic Building
Office Hours	-
Phone	+82-32-626-1145
Email	siwon.hwang@sunykorea.ac.kr

Course Description

Hands-on experience in solid and fluid mechanics and heat transfer. Emphasis is on the understanding of fundamental principles as well as familiarity with modern experimentation. Lectures at the beginning of the course provide background information and theories of experimentation. Student groups perform five experiments each in solid mechanics and in fluid mechanics and heat transfer. Report writing is an integral part of the course, with emphasis on design of experiment, interpretation and presentation of data, error analysis, and conclusions.

Course Learning Objectives

1. Demonstrate the ability to collect data from thermocouples, pressure sensors, pitot tube manometer, timer, moiré fringes, polariscope, fatigue testing machine, buckling machine, dynamic strain sensing, shear modulus tester, digital image recording.
2. Learn how to compare experimental data with theoretical predictions.
3. Learn how to work in a team and meet deadlines.
4. Develop technical writing skills.
5. Assess quantitatively experimental accuracy and dominant sources of uncertainties.

List of Experiments

Fluids Section

- Experiment 1: Linear Heat Conduction
- Experiment 2: Saturation Curve of Water
- Experiment 3: Measurements of Liquid Viscosities and Drag Coefficient of a Sphere
- Experiment 4: Natural Convection from a Sphere
- Experiment 5: Drag Force and Velocity Profiles for a Cylinder in Crossflow

Solids Section

- Experiment 1: Material Properties Determination: Elastic Modulus and Poisson Ratio
- Experiment 2: Stress Distribution Determination of a Bending Beam
- Experiment 3: Material Properties Determination: Shear Modulus
- Experiment 4: Deflection and Strain Measurements of a Beam under Static Loading
- Experiment 5: Column Buckling and Critical Load Analysis
- Experiment 6: Stress Distribution Determination Using Photoelasticity
- Experiment 7: Vibration Analysis and Dynamic Strain Measurements of a Beam
- Experiment 8: Fatigue Test of Materials

Laboratory Fee

A laboratory fee of 50,000 KRW is required.

Required Course Materials

Lab Manual	Hardcopy of Lab Manual (for Solids and Fluids sections) will be distributed during the semester.
MEC214 Lecture Notes	Hardcopy of Error Analysis section of SBU MEC214 lecture note will be given within the first two weeks of the semester.

- All other necessary materials will be posted on [Blackboard](#) or the [course website](#).
- Optional textbooks for Error Analysis:
 - R. S. Figliola and D. E. Beasley, *Theory and Design for Mechanical Measurements*, 6th Edition, Wiley, 2014 [[Publisher](#), [Amazon](#)].
 - J. R. Taylor, *An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements*, 2nd Edition, University Science Books, 1996 [[Publisher](#), [Amazon](#)].

Assignments

• Pre-Lab Reports

- Before you come to the laboratory, you must study the experiment you are going to perform from the Lab Manual and prepare a Pre-Lab Report. Instructor will sign your Pre-Lab Reports. Preparation of these reports is in line with SUNY Korea Flipped Learning Program.
- Each student must prepare his/her own report.
- You will not be allowed to start to do experiment in the laboratory until your Pre-Lab Report is ready.
- Pre-Lab Report should contains
 - A brief description of the experiment objective,
 - List of equipment including manufacturer and model number,
 - Equations and any analytical calculations need for the experiment,
 - Empty tables for all data which is needed to be collected.
- Each student should record neatly all data in his/her own report during the experiment. Even though the data is identical, it is useful when some data is not recorded by a student, there is a discrepancy in the data, or some data loses.

• Lab Reports

- Students should form groups of three individuals at the beginning of semester to perform all experiments.
- Each group must submit a single Lab Report for each experiment.
- Each student must write at least three reports as the First Author (combination of both Solids and Fluids sections).
- All Lab Reports should be typed.
- Reports must be submitted on Blackboard and also handed in at the beginning of the following session.
 - For submission on Blackboard, submit the PDF file of your report until the beginning of the following session. Please name the file as MEC317_Exp_#_Group_# (e.g., MEC317_Exp_6_Group_1). There is no need to include your Pre-Lab Reports and handwritten data for submission on Blackboard.
 - For handing in at the laboratory, attach the completed Pre-Lab Reports of all group members and also all handwritten data to the Lab Report.
- For each day your Lab Report is late, its grade will be reduced by 10%, regardless of who was the First Author of the report. No exceptions will be made.
- I will not accept your reports sent to my email address.

Reports Format

• Pre-Lab Reports

There is no need for Pre-Lab Reports to be typed but they should be prepared on white A4 sized papers and be stapled neatly in top left corner. Your name, date, course number, and experiment number should be written on the top of the first page.

• Lab Reports

All Lab Reports should be typed with a 12pt font. The required sections of the Lab Reports are listed in order of appearance as:

- A. **Title Page** (Including course number, experiment number and title, date, names of First Author and group members)
- B. **Abstract** (A single short paragraph which represents the entire experiment including purpose of experiment, the variables to be measured, measurement basic concepts, etc.)
- C. **Introduction** (Including answering to these questions: why this experiment is important? what is the application of this experiment in engineering or real life? etc.)
- D. **List of Equipment** (Including manufacturer and model number from your Pre-Lab Report)
- E. **Experimental Theory** (Detailed description of the theoretical basis of the experiment including formulas, figures, etc.)
- F. **Experimental Procedure** (Detailed description of the steps performed during your experiment to obtain the required data. Description must be in paragraph form, not in steps and commanding form. Do not simply copy the steps from the Lab Manual)
- G. **Results** (Including calculation of experimental results, figures, tables, etc.)
- H. **Discussion** (Including discussing the trends in the results, comparison with theoretical predictions, etc.)
- I. **Error Analysis** (Discussion of error analysis, uncertainty of reported results, source of errors, methods for reducing the errors, etc.)
- J. **Conclusions** (A single paragraph which briefly describe the experiment and the discussed results)
- K. **References** (If you have any)
- L. **Appendices** (Pre-Lab Reports of all group members, handwritten calculations, codes, etc.)

Notes:

- Don't simply copy the sentences from the Lab Manual. Express the concepts in your own words.
- Handmade drawings of experimental setup are permitted.
- Be sure to check your spelling.
- Number all the pages.
- All equations should be numbered.
- All figures and tables must be labeled with a number and a caption.
- All the numerical quantities (in figures, tables, calculations, etc.) must have proper units.
- Use MS Excel or MATLAB for making graphs of your experimental data.
- Refer to figures and tables in the text as: Fig. # and Table #.

Grading

The semester letter grade will be based on the Lab Reports grades. Each Lab Report is graded on a scale of 0 to 10 as

Abstract	0.5
Introduction	0.5
List of Equipment	0.5
Experimental Theory	1
Experimental Procedure	1
Results	1.5
Discussion	1.5
Error Analysis	2
Conclusions	0.5
Pre-Lab Report	0.5
Writing/Style/Clarity	0.5

Note: All group members will not necessarily receive the same grade for the course

Grading Scale

Grading will not be on a curve. It will be absolute as follows:

A [100, 95]%	A⁻ (95, 90]%	B⁻ (80, 75]%
B⁺ (90, 85]%	B (85, 80]%	C⁻ (65, 60]%
C⁺ (75, 70]%	C (70, 65]%	D⁻ (53, 50]%
D⁺ (60, 55]%	D (55, 53]%	
F (50, 0]%		

Schedule

Week	Lecture Monday, 2:00 PM – 2:53 PM,		Laboratory Wednesday, 2:00 PM – 4:50 PM	
	Topic	Date	Topic	Date
Week 1	Course Overview, Writing Lab Reports, Safety, Group Formation	Feb. 26	-	Feb. 28
Week 2	Error Analysis	Mar. 05	-	Mar. 07
Week 3	-		Experiment (Solids Section)	Mar. 14
Week 4	-		Experiment (Fluids Section)	Mar. 21
Week 5	-		Experiment (Solids Section)	Mar. 28
Week 6	-		Experiment (Fluids Section)	Apr. 04
Week 8	-		Experiment (Solids Section)	Apr. 11
Week 9	-		Experiment (Fluids Section)	Apr. 18
Week 10	-		Experiment (Solids Section)	Apr. 25
Week 11	-		Experiment (Fluids Section)	May. 02
Week 12	-		Experiment (Solids Section)	May. 09
Week 13	-		Experiment (Fluids Section)	May. 16
Week 13	-		Experiment (Solids Section)	May. 23
Week 14	-		Experiment (Solids Section)	May. 30

Attendance Policy of SUNY Korea

1. All students of SUNY Korea are required to attend every class.
2. Unexcused absences will affect seriously the student's final grade in the course.
3. If a student has over 20% unexcused absence, the student's final course grade will be an 'F'.
 - (I) If the class is a 150 minute class, and is held once a week, the 4th unexcused absence of a student will lead to an F grade of the course.
 - (II) If the class is a 75 minute class, and is held twice a week, the 7th unexcused absence of a student will lead to an F grade of the course.
 - (III) If the class is a 50 minute class, and is held three times a week, the 10th unexcused absence of a student will lead to an F grade of the course.
 - (IV) In Intensive English Course (IEC), if a student misses the class more than 40 hours in a semester, the student will receive an F grade on the course.
4. Students should report the reason of absence to the instructor in advance, or immediately after the absence.
5. When a student excuses his/her absence, the student must provide documentation of the reason for the absence to the instructor.
6. The instructor of the course reserves the right to excuse absences.
7. The course instructor may excuse the absence if the submitted documentation fulfills the conditions below.
 - (I) Extreme emergencies (e.g. death in the family)
 - (II) Severe medical reasons with doctor's note (Not a slight illness)
 - (III) Very important events (e.g. national conference, official school event)
8. At the end of semester, the course instructor should submit a copy of the attendance sheet to the Academic Affairs Office.

Disability Support Services (DSS) Statement:

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact One-Stop Service Center, Academic Building A201, (82) 32-626-1117. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

In addition, this statement on emergency evacuation is often included, but not required: Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and One-Stop Service Center.

Academic Integrity Statement:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the [academic judiciary website](#).

Critical Incident Management Statement:

The State University of New York, Korea expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

Subject to Change Notice

All materials, assignments, and deadlines are subject to change with prior notice. It is your responsibility to stay in touch with your instructor, review the course site regularly, or communicate with other students, to adjust as needed if assignments or due dates change.

Syllabus Disclaimer

The instructor views the course syllabus as an educational understanding between the instructor and students. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. The instructor reserves the right to make changes to the syllabus as deemed necessary. Students will be notified in a timely manner of any syllabus changes via email or in the course site Announcements. Please remember to check your SBU email and the course site Announcements often.