

MEC 220 - Practical Electronics for Mechanical Engineers, Fall 2020

Instructor: Cornelius Bradter
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Office hour: Thursday 12:00 to 13:00 o'clock or by appointment (room C623)

Lectures: Tuesday 10:30 – 11:50
Thursday 10:30 – 11:50
Even Weeks in person
(8/31 - 9/4, 9/14 - 18, 9/28 - 29, 10/12 - 16, 10/26 - 30, 11/9 - 13, 11/23 – 27)

Covid 19 related:

Every participant has to follow all rules and recommendations provided by SUNY Korea. This especially refers to wearing masks and to distancing rules during course and breaks.

Textbook: Horowitz, Paul and Hill, Winfield (2015): "The Art of Electronics", 3rd Edition, Cambridge University Press, ISBN: 978-0-521-80926-9.

Objectives: This combined lecture and laboratory course (2 credits) teaches basic knowledge of electronics with a focus on practical work. It provides mechanical engineering students with the fundamentals to do basic electronics work needed for laboratories, subsequent courses, and their professional careers.

Prerequisites: PHY127, PHY132, or PHY142.

Learning Objectives: Ability to

1. analyze simple resistive circuits
2. analyze circuits with operational amplifiers
3. analyze capacitive and inductive circuits
4. analyze circuits with transistors and diodes
5. analyze AC circuits prevalent in MEC field
6. read and interpret circuit diagrams
7. use information from product data sheets to solve a circuit design problem to meet given specifications in the absence of a prescribed solution

Schedule (subject to revision, especially succession):

1. Current, voltage, power, resistance, Ohm's law, Kirchhoff's laws
2. Node voltage, current mesh analysis, Thévenin and Norton equivalent circuits
3. Voltage and current as a function of time, switching functions, periodic functions, averages and means
4. Measurement and simulation
5. Inductors and capacitors
6. Filters and resonant circuits, complex impedance, RLC networks
7. AC circuits, AC power, Real, Reactive, Apparent Power, Power factor
8. AC motors, 3-phase power, transformers, fuses and circuit breakers
9. Diodes, basic circuit
10. Transistors, Fets, basic circuits
11. Operational amplifiers, basic circuits
12. Assemblies, design with electronic assemblies
13. Electronic design and manufacturing, EDA software

Tools: For some sessions, students will be asked to bring the Arduino electronics platform and their kits that have been used in MEC101
SUNY Korea will provide some additional parts for practical work.

Software: Arduino IDE (<https://www.arduino.cc/en/Main/Software>)
LT spice (schematics and simulation)
(<https://www.analog.com/en/design-center/design-tools-and-calculators/ltspice-simulator.html>)
Matlab is appreciated but not a prerequisites

Grading: There will be one midterm and a final exam. During the course, homework and/or lab reports are requested. Quizzes are part of the coursework.
Homework, lab reports and quizzes 50%
Midterm 20%
Final Exam 30%

Letter grading:	100-95	-	A	79-77	-	C+
	94-90	-	A-	76-74	-	C
	89-87	-	B+	73-70	-	C-
	86-84	-	B	69-65	-	D+
	83-80	-	B-	64-60	-	D
				< 60	-	F

Policies: Homework and exercises will be posted on the Blackboard. Original students' solutions will be held by the department. Students can view their graded work upon request.
The Blackboard can be accessed at <https://blackboard.stonybrook.edu/>
The time and details about the exams will be announced in the class (and also posted on the Blackboard) and may subject to change
It is the responsibility of students to make sure that they can access the Blackboard and that they have a working email registered with it. The Blackboard should be checked frequently for new materials
Exams will be closed book and note. A standard calculator will be required.

Disability Support Services (DSS):

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.

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: http://www.stonybrook.edu/commcms/academic_integrity/index.html

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.

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'.
(Example)
 - § 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.
 - § 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.
 - § 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.
 - § 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.
 - § Extreme emergencies (e.g. death in the family)
 - § Severe medical reasons with doctor's note (Not a slight illness)
 - § 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.