Syllabus for "Introductory Electricity and Magnetism "

PHYS 1304

INTRO E&M DR. D BALAKISHIYEVA

Textbooks and online homework system:

Primary textbook: Fundamentals of Physics Halliday, David, Robert Resnick, and Jearl Walker. 10th edition New York: John Wiley & Sons.

Online homework system: **WileyPlus.com**

It is mandatory to purchase an online access code for an online homework submission. This code will give also an access to an electronic version of the textbook.

Alternate textbook 1 (self learning, not for homework submission): Knight, Randall D**.** *Physics for Scientists & Engineers: A Strategic Approach with Modern Physics*. Boston, MA: Addison-Wesley.

Alternate textbook 2 (self learning, not for homework submission): Serway, Raymond A., and John W. Jewett, Jr. *Physics for Scientists and Engineers with Physics Now and InfoTrac*. New York: Brooks/Cole.

Course description

Introductory Electricity and Magnetism is a calculus-based college- level physics course for pre-

engineering and would-be science majors. Students finishing this course should have a strong conceptual understanding of physics and well-developed skills in performing and analyzing laboratory activities. This course utilizes guided inquiry and student-centered learning to foster the development of critical thinking skills.

Disability Accommodations

Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit http:// www.smu.edu/Provost/ ALEC/DASS to begin the process. Once registered, students should then schedule an appointment with the professor as early in the semester as possible, present a DASS Accommodation Letter, and make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

Accommodations for an extended time test need to be made in advance for all tests through DASS. If you

chose to take the test in class with the rest of the students, your test will be collected at the same time as others.

You are urged to make extended time arrangements through DASS. Our class size makes it impossible to accommodate all students who need extra test time.

Religious Observance

Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (See University Policy No. 1.9.)

Excused Absences for University

Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed

assignment for making up the work. (University Undergraduate Catalogue)

Extracurricular Activities

Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (University Undergraduate Catalogue)

Student Learning Outcomes

This is a calculus based course which will include some basic integration, differentiation, and discussion of the use of differential equations. Students will learn about the following topics: the concept of an electromagnetic (EM) field; understand the concepts of charge and current; know the concept of electrostatic potential and why it is useful; build an electric circuit and predict it’s behavior; understand duality of light.

1. Students will be able to develop quantitative models as related to the course subject matter.

2. Students will be able to assess the strengths and limitations of quantitative models and methods.

3. Students will be able to apply symbolic systems of representation.

4. Students will be able to test hypotheses and make recommendations or predictions based on results.

5. Students will be able to communicate and represent quantitative information or results numerically, symbolically, aurally, visually, verbally, or in writing.

Teaching strategies

30 - 35 minutes are devoted to lecture and demonstrations. Here, a concept is presented to emphasize practical/real-life applications, stressing important definitions and limitations. The rest of the class is devoted to solving set of problems and question-answer sessions, the students are guided in a

discussion (whole class or small group) to develop solutions to the problems. Weekly homework and quizzes will be assigned. Students are expected to dedicate minimum of ***6 hrs/week*** to this course outside the classroom.

Material to be covered in the course :

Intro

1 week

Charge and Electrostatics Coulomb's law

Quiz 1

HW 1

The Electric Field

1.5 weeks

The electric field
Point-charge distributions

Continuous charge distributions

Quiz 2

HW 2

Motion of charged particles in an electric field

Gauss' Law

1 week

Electric flux
Gauss's law (general)
Gauss's law and various continuous charge distributions

Quiz 3

HW 3

Exam 1 (Statics, Coulomb law, Gauss Law) in class

Electric Potential

1 week

Electric potential and potential difference
Potential differences in uniform electric fields

Potential and point charges
Potential and continuous charge distributions

Quiz 4

HW 4

Capacitance

1 week

Capacitance
Gauss' law and capacitance

Combination of capacitors Energy stored in capacitors Dielectrics

Quiz 5

HW 5

DC Circuits

2 weeks

Ohm's law
Resistivity
Electrical power

Quiz 6

HW 6

Electromotive force and internal resistance
Equivalent resistance

Kirchhoff's rules RC circuits

Quiz 7

HW 7

Exam 2 (El. Potential, Capacitance, DC circuits) in class

Magnetism

2 weeks

Magnetic force on moving charges and currents
Path of moving charge in a magnetic field
Hall effect

Quiz 8

HW 8

Biot-Savart law

Parallel conductors Ampere's law Solenoids and toroids

Quiz 9

HW 9

Magnetic Induction

1.5 weeks

Magnetic flux
Gauss's law of magnetism Faraday's law of induction

HW 10
Quiz 10

Lenz's law
Induced emf and electric fields

Generators and motors,

Maxwell's equations

Test 3 (Magnetic Force, Magnetic flux, Faraday's and Lenz's laws) in class

Inductance

1 week

Self-inductance
RL circuits
Energy in magnetic fields
Mutual inductance
Electronic oscillations in LC circuits The RLC circuit

Quiz 11

HW 11

Alternating Current

1 week

Electromagnetic waves

1 week

Nature of light Interference Diffraction

Quiz 12

HW 12

Final Exam (Cumulative)

WED., MAY 9	11:30 AM - 2:30 PM

in room 158 Fondren Science Building

Grading

All of the homework assigned on WileyPlus.com will be graded by WileyPlus software and those grades will be kept on WileyPlus.com website. Above mentioned grades will not be transferred onto Canvas site but taken into account at the end for final grade calculation.

Final Grade will be calculated as following:

"Final Grade" will be calculated as following:

2x20% Tests + 20% Online Quizzes + 20% Homework + 20% Final Exam Grade

Letter grade breakdown:

“A” : [93%-100%] ,

“A-“ : [89%-92%] ,

“B+” : [83%-88%] ,

“B” : [78%-82%] ,

“B-” : [73%-77%] ,

“C+” : [69%-72%] ,

“C” : [64%-68%] ,

“C-” : [61%-63%] ,

“D” : [50%-60%] ,

“F” < 50%

There is no grade curving in this course

One lowest Test grade (excluding Final Exam) and one lowest online Quiz grade will be dropped.

Tests and Final Exam will not have extra credit problems. There is no makeup test or exam.

Students will take 3 tests and after lowest grade will be dropped 2 equally weighted (20% each) tests grades will remain.

Each test will last 50 min.

Final Exams: Please, refer to Academic calendar at http://smu.edu/ registrar/ academic_calendar.asp