

Syllabus Physics 222, Calculus-Based Physics I I

4 Credit Hours / 6 Contact Hours (3 Hours Lecture - 3 Hours Laboratory)

Semester: Spring 2012, Lecture Tues/Thurs 9:30 am – 10:45 am Room D203
Laboratory Wed 9:00 am – 11:45 pm Room B208

Instructor: Lou Doboe

Email: ldoboe@trcc.commnet.edu

Phone: 860-857-4067

Office Hours: By appointment only.
Tuesday (11:00 am – 1:50 pm) (Room D205E)

Text:

Physics for Scientists & Engineers with Modern Physics 4th Ed., (2009) Douglas Giancoli.
ISBN-13: 978-0-13-149508-1

Optional:

Student Pocket Companion to Physics for Scientists & Engineers with Modern Physics 4th Ed., (2009) Biman Das.
ISBN-13:978-0-13-227326-8

Grading:	3 Exams:	30%
	Weekly Quiz:	10%
	Final Exam (cumulative):	35%
	Laboratory:	25%

Attendance: Will be monitored in Lecture. Required in Laboratory. The lowest Lab Report grade will be dropped when computing the Laboratory portion of the final grade which will allow for one missed Laboratory session over the course of the semester. No Make-up of a missed Laboratory Session is possible. The lowest quiz grade will also be dropped when computing the quiz portion of the final grade. No Make-up of a missed quiz is possible. In class exams may be given during the Laboratory class time at the instructor's discretion. Make-up exams will only be given in **EXTREME** circumstances and only if **PREVIOUS** arrangements have been made.

Class Cancellation: In the unlikely event that a class needs to be cancelled by the instructor, you will be notified by the instructor via email by noon on the day of the class cancellation using the email address you have on record with the college.

Extra Credit: There will be **no** "extra credit" assignments for this course.

Participation: Completion of homework, classroom participation and preparation for exams is essential for your success in this course.

Plagiarism & Academic Honesty: At TRCC, we expect the highest standard of academic honesty. The Board of Trustees' Proscribed Conduct Policy prohibits cheating on examinations, unauthorized collaboration on assignments, and unauthorized access to examinations or course materials. Plagiarism will not be tolerated.

Course Objectives: This is a calculus-based introduction to the basic concepts of the classical physics of electricity and magnetism. Major topics will include the study of electromagnetic forces and waves, components of direct current and alternating current circuits, Maxwell's Equations, the wave nature of light, and an introduction to modern physics. The course will emphasize the theoretical aspects of physics and will help the student develop effective problem solving strategies. Laboratories will be designed to allow the student to visualize the important concepts introduced in lecture and to increase student understanding of the scientific process

Course Outcomes: The student will be able to:

- Read and follow instructions
- Assemble and use lab equipment used to study electricity, magnetism and optics.
- Collect data in an organized fashion, noting precision of measurement and unit labels.
- Analyze data by creating graphs (by hand and by computer, with slope and intercept, if needed) and by correctly inserting data into equations.
- Round results and state measurements using the concepts of accuracy and precision.
- Calculate % error, where applicable.
- Explain sources of error in an experiment based on the limitations of the equipment used.
- Draw conclusions by relating their results to the appropriate physics principles.
- Use the SI system of measurements in solution of physics problems.
- Perform unit conversions and cancel units correctly during computations.
- Apply calculus to physics problems.
- Explain electric charge and its conservation.
- Explain Coulomb's Law and analyze the electrostatic forces between charges.
- Analyze the electric field surrounding a charges or group of charges.
- Explain Gauss's Law and analyze the electric flux through closed surfaces.
- Explain electric potential and compare the potential related to an electric field or due to point or distributed charges.
- Explain capacitance and analyze the characteristics of capacitors in series and in parallel.
- Explain electrical energy storage and predict the electrical energy stored by capacitors.
- Explain electrical current and resistance and apply Ohm's Law.
- Explain resistivity and electric power.
- Compare direct and alternating current.
- Predict the characteristics of various DC circuits.
- Apply Kirchoff's Rules to predict the characteristics of various circuits.
- Predict and explain the characteristics of RC circuits.
- Explain magnetism and electromagnetism.
- Predict the force on an electric current in a magnetic field.
- Using Ampere's Law, analyze the field inside and outside a conductor.
- Explain electromagnetic induction using Faraday's Law and Lenz's Law.
- Explain inductance and analyze the characteristics of LR and LC circuits.

- Evaluate how Maxwell's Laws explain the production and characteristics of electromagnetic waves.
- Describe the electromagnetic spectrum and analyze characteristics of electromagnetic waves.
- Compare the reflection and refraction of light and analyze the characteristics of systems of lenses.
- Evaluate the credibility of double-slit interference patterns as evidence of the wave nature of light.
- Analyze the line spectra of different light sources using a spectrometer.
- Evaluate consequences of Einstein's special theory of relativity.

Accommodations: If you have a question regarding a disability that may affect your progress in this course, please contact one of the college's Disability Service Providers as soon as possible. Chris Scarborough (892-5751) generally works with students who have learning disabilities or attention deficit disorder. Kathleen Gray (885-2328) generally works with students who have physical, visual, hearing, medical, mobility, and psychiatric disabilities. Matt Liscum (383-5240) also works with students who have disabilities.