



Purpose: It is the intention of this Administrative-Master Syllabus to provide a general description of the course, outline the required elements of the course and to lay the foundation for course assessment for the improvement of student learning, as specified by the faculty of Wharton County Junior College, regardless of who teaches the course, the timeframe by which it is instructed, or the instructional method by which the course is delivered. It is not intended to restrict the manner by which an individual faculty member teaches the course but to be an administrative tool to aid in the improvement of instruction.

Course Title – Engineering Physics II: Electricity, Magnetism and Optics

Course Prefix and Number – PHYS 2426

Department - Physics

Division – Math and Science

Course Type: (check one)

- Academic General Education Course (from ACGM – but not in WCJC Core)
- Academic WCJC Core Course
- WECM course (This course is a Special Topics or Unique Needs Course: Y or N)

Semester Credit Hours # : Lecture hours# : Lab/other hours # **4:4:2**

Equated Pay hours for course – 5.2

| |
|--------------------------|
| List Lab/ Other Hours |
| Lab Hours 2 |
| Clinical Hours |
| Practicum Hours |
| Other (list) |

Course Catalog Description – Intended for engineering, physics, chemistry, and mathematics students. This calculus based course includes electrostatic force, field and potential, electrical current, DC circuits, magnetic field, electromagnetic induction and applications, AC circuits, properties of matter, ray and wave optics. This course provides part of the background necessary for higher level student, particularly in Physics and Engineering.

Prerequisites/Co requisites – MATH 2414 AND PHYS 2425 or consent of the department head

Type: ACAD

Prepared by Frank Carey

Date 4/10/12

Reviewed by department head Frank Carey

Date 4/10/12

Accuracy verified by Division Chair Kevin Dees

Date 4/12/12

Approved by Dean of Vocational Instruction or Vice President of Instruction Lac

Date 11-9-12



I. Topical Outline – Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, clinical or other non-lecture instruction):

Lecture:

TOPICAL OUTLINE DEDICATED INSTRUCTIONAL TIME

- Electric Charge and Coulomb’s Law One Week
- Electric Field and Gauss’ Law One week
- Electrostatic Potential, Capacitors Two weeks
- DC Circuits Two weeks
- Magnetic Field Two weeks
- Electromagnetic Induction, Motors,
Magnetic Properties of Matter Two weeks
- Alternating Current Two weeks
- Electromagnetic Waves,
Maxwell’s Equations One week
- Reflection, Refraction and
Geometrical Optics One week
- Interference, Diffraction, Wave Optics One week

Lab Work:

EXPERIMENTS:

- Electrostatic field and Equipotential Surfaces
- Volt and Ammeters, The Oscilloscope.
- DC Series and Parallel circuits.
- Construction of a simple power supply.
- RC circuits.
- RLC circuits.
- Induced Emf.
- Lenses and mirrors.
- The compound Microscope.

II. Course Learning Outcomes

| Course Learning Outcome | Method of Assessment |
|--|-----------------------------|
| 1. Solve problems involving electrostatic force, electrostatic field, electrostatic potential. | 1. Tests, Final exam. |
| 2. Solve problems involving electric current, resistivity, ohm’s law, kirchhoff’s rules. | 2. Tests, Final exam. |
| 3. Solve problems involving magnetic field, electromagnetic induction, magnetic properties of matter | 3. Tests, Final exam. |
| .4. Solve problems in alternating current circuits, RC, RL, RLC and applications. | 4. Tests, Final exam. |
| 5. Solve problems involving ray and wave optics, mirrors, lenses and optical apparatuses. | 5. Tests, Final exam. |

III. Required Text(s), Optional Text(s) and/or Materials to be Supplied by Student.

University Physics, Revised edition, Benson, Harris, New York: John Wiley and Sons, Inc., 1996

IV. Suggested Course Maximum – Lecture: 40; Lab: 20

V. List any specific spatial or physical requirements beyond a typical classroom required to teach the course.

Physics Laboratory required for lab component.

VI. Course Requirements/Grading System – Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course

Evaluative Procedures:

1. Four major tests
2. Homework assignments
3. Laboratory reports
4. Final Exam

The following method is used to arrive at the final grade:

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|-------------------|-----|
| All tests. | 60% |
| Laboratory grade | 10% |
| Homework | 5% |
| Final examination | 25% |

The grade classifications as outlined in the College Catalog are employed:

| | |
|---|-----------|
| A | Excellent |
| B | Good |
| C | Average |
| D | Poor |
| F | Failure |
| W | Withdrawn |

VII. Curriculum Checklist

- **Academic General Education Course** (from ACGM – but not in WCJC Core)
No additional documentation needed

- **Academic WCJC Core Course**
Attach the Core Curriculum Checklist, including the following:

- Basic Intellectual Competencies
- Perspectives
- Exemplary Educational Objectives

- **WECM Courses**
If needed, revise the Program SCANS Matrix & Competencies Checklist.



Page 1: Competencies

| Course Prefix & Number: PHYS 2426 | |
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| Competency | Method of Assessment |
| READING: Reading at the college level means the ability to analyze and interpret a variety of printed materials – books, articles, and documents. | Assimilation of lecture and lab reading assignments is measured through homework, lab reports, tests and final exam |
| WRITING: Competency in writing is the ability to produce clear, correct, and coherent prose adapted to purpose, occasion, and audience. | Writing of lab reports in a clear, correct and coherent manner. Writing homework, tests and final exam. |
| SPEAKING: Competence in speaking is the ability to communicate orally in clear, coherent, and persuasive language appropriate to purpose, occasion, and audience. | |
| LISTENING: Listening at the college level means the ability to analyze and interpret various forms of spoken communication. | Demonstrated through the writing of lab reports, tests and final exam |
| CRITICAL THINKING: Critical thinking embraces methods for applying both qualitative and quantitative skills analytically and creatively to subject matter in order to evaluate arguments and to construct alternative strategies. | Assessed through problem assignments, laboratory work, tests and final exam |
| COMPUTER LITERACY: Computer literacy at the college level means the ability to use computer-based technology in communicating, solving problems, and acquiring information. | Lab reports. |



Page 2: Perspectives

| Course Prefix & Number: PHYS 2426 | |
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| Perspective | Method of Assessment |
| 1. Establish broad and multiple perspectives of the individual in relationship to the larger society and world in which he or she lives, and help the student to understand the responsibilities of living in a culturally- and ethically-diversified world; | |
| 2. Stimulate a capacity to discuss and reflect upon individual, political, economic, and social aspects of life to understand ways to be a responsible member of society; | |
| 3. Recognize the importance of maintaining health and wellness; | |
| 4. Develop a capacity to use knowledge of how technology and science affect lives; | Lab reports, homework, tests and final exam |
| 5. Develop personal values for ethical behavior; | |
| 6. Develop the ability to make aesthetic judgments; | |
| 7. Use logical reasoning in problem solving; | Problem assignments, lab reports, tests and final exam. |
| 8. Integrate knowledge and understanding of the interrelationships of the scholarly disciplines | |

Page 3: Exemplary Educational Objectives

| Course Prefix & Number: PHYS 2426 | |
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| Component Area: Natural Sciences | |
| Exemplary Educational Objective | Method of Assessment |
| 1. Understand and apply method and appropriate technology to the study of natural science. | Lab reports, homework, tests, final exam |
| 2. Recognize scientific and quantitative methods and the difference between these approaches and other methods of inquiry; and communicate findings, analyses, and interpretations both orally and in writing. | Lab reports, homework, tests, final exam |
| 3. Identify and recognize the differences among competing scientific theories. | Lab reports, homework, tests, final exam |
| 4. Demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies. | Test, final exam |
| 5. Demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture. | Homework, tests, final exam |

