PHYS 4023 – INTRODUCTORY QUANTUM MECHANICS I

Instructor	**Dr. Orion Ciftja**	**Office Hours**	MWF: 10 AM – 12:00
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Phone	936-261-3137	**Time & Place**	P01: T 5:00- 7:00 PM, Room 122

CATALOG DESCRIPTION:

Three (3) Semester Credit hours. Inadequacy of classical mechanics, wave-particle duality, wave function, uncertainty relation, Schrodinger's equation, expectation values, operator formalism, measurement, the correspondence principle, etc.

PREREQUISITE: PHYS 2514, MATH 2024, or equivalent .

TEXTBOOK: Quantum Physics, 3-rd Ed (2003), Stephen Gasiorowicz, Publisher: Wiley [ISBN 0-471-05700-2]

COURSE GOAL: This course is intended for students majoring in one of the physical sciences or engineering or for students in other majors who like to incorporate their strong mathematical background in the learning of quantum physics. It can be used in pursuing pre-professional programs in medicine, dentistry, pharmacy, veterinary medicine, or other health programs.

COURSE OUTCOMES:

Upon completion of this course, it is expected that the students will gain enough knowledge of the theory covered to apply it to the solution of a wide range of practical problems that involve physics. Hopefully this will help the students better understand the theory of operations of the many instruments and devices that they will encounter as they become employed in the various fields mentioned earlier. In addition, it will help them solve new problems that they will possibly encounter on their various fields of employment that require basic knowledge of physics.

COURSE POLICIES:

This course uses the lecture format. Selected materials in each chapter will be covered in lecture. You should read the entire assigned chapter before class. The lecture will not replace reading the materials. The lecture will be to amplify and explain the materials in the textbook. Homework problems will be assigned during the entire semester for each chapter covered. It is expected that the student solves these problems prior to the next class meeting. Any student unable to solve a particular assigned problem(s) should contact the professor. Pop quizzes may be given occasionally on covered materials. It is expected that you will need to spend at least two hours studying outside the class for each hour spent in class. That means you should plan to devote a minimum of six hours per week for this class.

HOMEWORK AND GRADING:

There are four examinations in this class, two examinations during the first half of the semester and two more examinations during the second half of the semester. Each exam is worth 20 points and a total of 80 points of your final grade. Makeup examinations will be given ONLY for a university-approved absence verified in writing. The remaining 20 points of your final grade will come from the homework assignments, quizzes, classroom discussion and any special project(s) <u>together</u>, <u>any</u> or <u>some of them</u> chosen by the professor. Homework assignments will be turned in on their due dates only; no late homework assignments will be accepted.

The grading system is as follows:

90 – 100	**A**
80 - 89	**B**
70 - 79	**C**
60 - 69	**D**
0 - 59	**F**

ORAL AND WRITTEN COMMUNICATIONS

Oral or written communication will be given through exams, homework, classroom and individual discussion, and use of optional web-based materials.

ATTENDANCE POLICY:

Class will start and end at the prescribed times. Attendance at every class is expected and is each student's responsibility. Absence or tardiness may result in lowered grades. Excessive absenteeism, whether EXCUSED or UNEXCUSED, may result in a student's course grade being reduced or assignment of a grade of "F". Absences are accumulated beginning with the first day of class. The University Undergraduate Catalog (1998 – 2001, pp.88-91) provides more detailed information.

STUDENT ACADEMIC APPEALS PROCESS: (Refer to the University Undergraduate Catalog, 1998 –2001, pp. 88-91)

COURSE OUTLINE

Week (Starting on)	Topic	Note
1 (Jan. 16)	**Ch. 1:** The emergence of quantum mechanics	
2 (Jan. 23)	**Ch. 1**: (Continued)	
3 (Jan. 30)	**Ch. 2**: Wave particle duality, probability, and the Schrodinger equation	
4 (Feb. 6)	**Ch. 2**: (Continued)	
5 (Feb. 13)	Exam. # 1 **Ch 3**: Eigenvalues, eigenfunctions, and the expansion postulate	Exam. #1
6 (Feb. 20)	**Ch. 3**: (Continued)	
7 (Feb. 27)	Exam**. #2** **Ch 4:** One-dimensional potentials	Exam. # 2
8 (Mar. 5)		**SPRING BREAK**
9 (Mar. 12)	**Ch. 5:** The general structure of wave mechanics	
10 (Mar. 19)	**Ch. 5:** (Continued)	
11 (Mar. 26)	**Ch. 6**: Operator methods in quantum mechanics	
12 (Apr. 2)	**Ch. 6** : (Continued)	
13 (Apr. 9)	Exam. #3 **Ch. 7:** Angular Momentum	Exam. #3
14 (Apr. 16)	**Ch. 8**: The Schrodinger Equation in three dimensions and the Hydrogen atom	
15 (Apr. 23)	**Ch. 8**: (Continued)	
16 (Apr. 30)	Final Exam Period	**Final Exam: See Final Exam Schedule**

THIS SCHEDULE IS VARIABLE