המחלקה
לכימיה
הפקולטה למדעים מדויקים
אוניברסיטת בר־אילן

תאריך עדכון:

שם ומספר הקורס: פוטוכימיה

Photochemistry

מספר הקורס: 84-967-01

ד"ר יעקב טישלר

סוג הקורס: שיעור

שנת לימודים: תש"פ **סמסטר**: א' יום שלישי 12:0014:00 **היקף שעות**:

שעתיים סמסטריאליות 1 נק"ז

אתר הקורס באינטרנט:

א. מטרות הקורס (מטרות על / מטרות ספציפיות):

The goal of this course is to learn Photochemistry, the study of chemical reactions and isomerizations that are induced by the interactions of light and matter. Students will learn the first and second laws of photochemistry. Classic examples of photochemistry such as photosynthesis, vitamin D production, rhodopsin isomerization and more, will be covered in depth. Students will learn the different mechanisms by which light interacts with chemicals and influences chemical processes, and how to characterize the efficiency and kinetics of photochemical processes. A final goal of this course is to acquire design rules for generating useful photochemical products.

ב. תוכן הקורס: (רציונל, נושאים)

Photochemical processes are an integral part of Nature and everyday life that affect plants' production of glucose, our ability to see, and the formation of the ozone layer. Photochemical pathways often provide a more efficient means for generating a given chemical reaction, compared to heating substances, because electrons can be promoted to a specific energy level with very high probability. In some cases, photo-chemistry provides the only known way of achieving a given reaction.

ג. מהלך השיעורים: (שיטות ההוראה, שימוש בטכנולוגיה, מרצים אורחים)

The class will be based on a series of lectures, a text book, reading assignments, homeworks, and a final project. Homework will require students to use computer based analytical tools such as Excel.

תכנית הוראה מפורטת לכל השיעורים: (רשימה או טבלה כדוגמת המצ"ב)

מס' השיעור	נושא השיעור	קריאה נדרשת	הערות
1	Introduction to Photochemistry		
2	First and Second Laws of Photochemistry, and Photochemical Reactions		
3	Optical Properties of Materials		
4	Jablonski diagrams		
5	Frank Condon Principle		
6	Energy Transfer and Electron Transfer		
7	Photolysis		
8	Alkene Isomerization		
9	Carbonyl Compounds		
10	Photointiators and Radical Production		
11	Photosynthesis		
12	Photocatalysis and Photoelectrochemistry		
13	Spectroscopic Characterization Techniques		
14	Kinetics of Photochemical reactions		

ד. חובות הקורס: and complete a final project. The final project will involve a case study of a specific photochemical reaction, its properties and applications. The study will involve an in depth analysis of research articles and kinetics using the tools of the course. Students will be required to write up their findings and present them to the rest of the class in an end-of-semester presentation

ה. דרישות קדם:

Physical Chemistry, Quantum Mechanics, Thermodynamics

ו. מרכיבי הציון הסופי (ציון מספרי / ציון עובר):

Students will be required to complete homework assignments, attend lecture, Grade will be given as follows:

- 60% Final Project
- 30% Homework
- 10% Attendance

ז. ביבליוגרפיה: (חובה/רשות)

ספרי הלימוד (textbooks) וספרי עזר נוספים:

Principles of Molecular Photochemistry: An Introduction
By Nicholas J. Turro, V. Ramamurthy, Juan C. Scaiano

ח. חומר מחייב למבחנים: N/A