Theory of Condensed Matter

The University of Toledo
(College of Natural Science and Mathematics)
(PHYS 4510/5510)

Instructor:	Yanfa Yan	**Class Location**:	MH 4009
Email:	yanfa.yan@utoledo.edu	**Class Day/Time**:	MWF 2:30-3:25pm
Office Hours:	12:00-2:00pm (MWF)	**Lab Location**:	N/A
Office Location:	MH4002	**Lab Day/Time**:	N/A
Office Phone:	419 530 3918	**Credit Hours**:	3
Term:	Fall, 2019		

COURSE/CATALOG DESCRIPTION

Crystal lattices and structures, reciprocal lattice and kinematical diffraction theory. Survey of binding in crystals. Lattice dynamics and phonons. Thermodynamic, electronic, and optical properties of insulators, semiconductors, metals and alloys.

COURSE OVERVIEW

Crystal structural, , reciprocal lattice, diffraction, phonons, electronic and optical properties, semiconductors, and metals

STUDENT LEARNING OUTCOMES

Students are expected to understand the fundamentals of the physics of condensed Matters, specifically crystalline materials

TEACHING STRATEGIES

The teaching will include class lecture and office hour Q&A (face-to-face) and home work (email). Students are welcome to have face-to-face Q&A or course-related conversation at anytime.

PREREQUISITES AND COREQUISITES

*Undergraduate level **PHYS 3320** Minimum Grade of D- and Undergraduate level **PHYS 3410** Minimum Grade of D-*

REQUIRED TEXTS AND ANCILLARY MATERIALS

Text: Charles Kittel, Introduction to Solid State Physics (8^{th} Edition)
Supplemental Texts: Solid State Physics, by Ashcroft and Mermin

TECHNOLOGY REQUIREMENTS

None

UNIVERSITY POLICIES

Policy Statement on Non-Discrimination on the basis of Disability (ADA)

The University is an equal opportunity educational institution. Please read The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.)

Academic Accommodations

The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office.)

GRADING

Homework:	20%	
Midterm 1 (Sept. 23):	20%	(Chapters 1, 2)
Midterm 2 (Oct. 14):	20%	(Chapters 3-5)
Midterm 3 (Nov. 8):	20%	(Chapters 6-8)
Midterm 4 (Final) (Dec. 9):	20%	(Chapters 9, 10)

COURSE SCHEDULE

(schedule subject to change)

Month	Monday		Wednesday		Friday	
August	26	Chapter 1	28	Chapter 1	30	Chapter 1
September	2	Labor Day	4	Chapter 2	6	Chapter 2
	9	Chapter 2	11	Chapter 3	13	Chapter 3
	16	Chapter 3	18	No class (Conference)	20	XRD experiment
	23	Midterm 1	25	Chapter 4	26	Chapter 4
	30	Chapter 5	2	Chapter 5	4	Chapter 5
October	7	Chapter 6	9	Chapter 6	11	Fall break
	14	Midterm 2 (Quantum)	16	Chapter 6 (Quantum)	18	Chapter 6 (Quantum)
	21	Chapter 6	23	Chapter 7	25	Chapter 7
	28	Chapter 7	30	Chapter 7	1	Chapter 8
November	4	Chapter 8	6	Chapter 8	8	Midterm 3
	11	Veteran's day	13	Chapter 9	15	Chapter 9
	18	Chapter 9	20	Chapter 10	22	Chapter 10
December	25	Lecture 33 (MRS)	27	Lecture 34 (MRS)	28	Thanksgiving
	3	No class (MRS meeting)	5	No class (MRS meeting)	7	No class (MRS meeting)
	9 (2:45pm-4:45pm)	Final	11		13	

Fall 2018 PHYS 4510/5510 homework

Ch.1: 1-3

Ch.2: 1, 3, 5

Ch.3: 2-4

Ch.4: 1, 4, 5

Ch.5: 1, 2, 5

Ch.6: 2, 4, 7

Ch.7: 1, 2

Ch.8: 1-3

Ch.9: 1, 2, 4