

**PHYSICS 425 – Solid State Physics**  
**SPRING 2013 (MW 4.00 pm – 5.15 pm @ Neckers 410)**

**Instructor:** Thushari Jayasekera  
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**Office Hours:** Wednesday 2.00 - 4.00 pm

**Text Book:** : *Introduction to Solid State Physics C. Kittel*  
**Other References:** *Solid State Physics – ASHCROFT/MERMIN*  
*Elementary Solid State Physics – M. A. Omar*

*Course Content:*

**ATOMIC STRUCTURE:**

- *The idea of crystals*
- *Introduction to crystals -2-D crystal structures and their symmetries*
- *Three Dimensional Crystal Structures*
- *Experimental Determination of Crystal Structures – Introduction to Reciprocal Lattice*
- *Surfaces and Interfaces*
- *Complex Structures (Alloys, Glasses, Polymers etc)*

**ELECTRONIC STRUCTURE:**

- *The single electron model*
- *The Schrodinger Equation and Symmetry – Bloch's Theorem*
- *Nearly Free Electrons and Tight Binding Model*
- *Electron-Electron Interactions: Introduction to Advanced Methods for Electronic Structure Calculations*
- *Calculation of Electron Band Structures - Metals, Semiconductors and Insulators*

**MECHANICAL PROPERTIES:**

- *Introduction to Lattice Vibrations and their Applications*

**SPECIAL TOPICS:**

- *Nanostructures*

**Grading:** Homework & Quizzes --- 30%  
Exam 1 --- 20 %

Exam 2	---	20 %
Final Exam	---	30%
Total	=	100%

<b>Grade Policy:</b>	<b>A</b>	<b>85% -100%</b>
	<b>B</b>	<b>75 % - 84 %</b>
	<b>C</b>	<b>60 % - 74 %</b>
	<b>D</b>	<b>50 % - 59.9 %</b>
	<b>F</b>	<b>Less Than 50%</b>

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Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.