



<b>Goals and Objectives</b>	At the end of this course students should be able to: <ul style="list-style-type: none"> <li>•Define concepts such as lattice, point and space groups</li> <li>•Be familiar with Bragg's Law and explain its relation to crystal structure</li> <li>•Identify and describe different diffraction methods</li> <li>•Interpret and assign X-ray and electron diffraction patterns</li> </ul>
<b>Required Knowledge</b>	Students are expected to have successfully completed, or be familiar with the contents of, Fundamentals of Materials Science (KAUST 200-level class). Helpful background reading about materials: <i>Materials Science and Engineering: An Introduction</i> (7th. Ed.), by W. D. Calister, John Wiley and Sons; ISBN: 0-471-73696-1.
<b>Reference Texts</b>	Primary: C. Hammond, <i>The Basics of Crystallography and Diffraction</i> , Oxford University Press, 2009. Secondary: G.S. Rohrer, <i>Structure and Bonding in Crystalline Materials</i> . Cambridge University Press, 2001.
<b>Method of evaluation</b>	<b>30.00%</b> - Final exam <b>20.00%</b> - Presentation <b>30.00%</b> - Midterm exam <b>20.00%</b> - Homework /Assignments
<b>Nature of the assignments</b>	The student will be expected to read the primary textbook in advance of lectures. Two homeworks will be given during the semester and the student will be expected to give a presentation on an advanced topic related to the course, for which there will be time set aside during class hours for guidance.
<b>Course Policies</b>	The graduate student is expected to be independent and get more information by him/herself. Plagiarism and references: Always cite references and attribute the work. Students should attend all lectures. Frequent absence will be penalized up to 5% of the final grade).
<b>Additional Information</b>	The instructors reserve the right to make changes to the syllabus and schedule of lectures.

## Tentative Course Schedule

*(Time, topic/emphasis & resources)*

Week	Lectures	Topic
1	T [ ] <del>AEDEBA</del> Wed 01/25 <del>000000</del>	on 23 Jan: Discussion of syllabus and introduction to crystallography Wed 25 Jan: Materials background I
2	T [ ] <del>AEDEBA</del> Wed 02/01 <del>000000</del>	on 30 Jan: Materials background II Wed 1 Feb: 1D and 2 D patterns, lattices and symmetries
3	T [ ] <del>AEDEBA</del> Wed 02/08 <del>000000</del>	on 6 Feb: Bravais lattices and their symmetries I Wed 8 Feb: Bravais lattices and their symmetries II
4	T [ ] <del>AEDEBA</del> Wed 02/15 <del>000000</del>	on 13 Feb: Crystal symmetry, point groups and space groups I Wed 15 Feb: Crystal symmetry, point groups and space groups II
5	T [ ] <del>AEDEBA</del> Wed 02/22 <del>000000</del>	on 20 Feb: Crystal symmetry, point groups and space groups III Wed 22 Feb: Crystal symmetry, point groups and space groups IV
6	T [ ] <del>AEDEBA</del> Wed 03/01 <del>000000</del>	on 27 Feb: Session with librarian (tentative) Wed 1 Mar: Discussion of topical projects I
7	T [ ] <del>AEDEBA</del> Wed 03/08 <del>000000</del>	on 6 Mar: Mid-term exam Wed 8 Mar: Properties of crystals
8	T [ ] <del>AEDEBA</del> Wed 03/15 <del>000000</del>	on 13 Mar: Reciprocal lattice I Wed 15 Mar: Reciprocal lattice II
9	T [ ] <del>AEDEBA</del> Wed 03/22 <del>000000</del>	[ ] 20 Mar: Discussion of topical projects II Wed 22 Mar: Diffraction of X-rays I
10	T [ ] <del>AEDEBA</del> Wed 03/29 <del>000000</del>	on 27 Mar: Diffraction of X-rays II Wed 29 Mar: Electron diffraction I
11	T [ ] <del>AEDEBA</del> Wed 04/05 <del>000000</del>	on 3 Apr: Spring Break Wed 5 Apr: Spring Break
12	T [ ] <del>AEDEBA</del> Wed 04/12 <del>000000</del>	on 10 Apr: Electron diffraction II Wed 12 Apr: Electron diffraction III
13	T [ ] <del>AEDEBA</del> Wed 04/19 <del>000000</del>	on 17 Apr: Neutron diffraction Wed 19 Apr: Discussion of topical project III
14	T [ ] <del>AEDEBA</del> Wed 04/26 <del>000000</del>	on 24 Apr: Practical aspects of X-ray diffraction Wed 26 Apr: Student presentations I
15	T [ ] <del>AEDEBA</del> Wed 05/03 <del>000000</del>	[ ] 1 May: Student presentations II Wed 3 May: Student presentations III
16	T [ ] <del>AEDEBA</del> Wed 05/10 <del>000000</del>	[ ] 8 May: Revisions Wed 10 May: Revisions
17	T [ ] <del>AEDEBA</del> Wed 05/17 <del>000000</del>	on 15 May: Final exams week Wed 17 May: Final exams week
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### Note

The instructor reserves the right to make changes to this syllabus as necessary.