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| 科目名 | Course Title |
| 物性物理学I(Condensed Matter Physics I) | |
| 学科・専攻 | Department/Program |
| G30 Physics | |
| 受講年次 | Grade |
| 3rd | |
| 授業形態 | Class style |
| 必修・選択の別 | Compulsory or Elective |
| 講義 | * See "Remarks" |
| 時間割コード | Registration code |
| 0680190 | |
| 開講期・曜日・時限 | Semester,Day & Period |
| Fall semester Mon : 4 | |
| 単位数 | Credit |
| 2 | |
| 科目区分 | Course type |
| Specialized Courses | |
| 担当教員 | Instructor |
| GELLOZ Bernard Jacqu(GELLOZ Bernard Jacques) | |
| 所属研究室 | Laboratory |
| J-Lab | |
| 連絡先 | Contact |
| bernard.gelloz@nagoya-u.jp | |
| 居室 | Room |
| 615 | |

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| 講義の目的とねらい | Course purpose |
| The purpose of this course is to learn about the common crystal structures of solids, some of their general properties, and their determination by diffraction techniques. | |
| 履修要件 | Prerequisite |
| Fourier transform; Basics of quantum mechanics and waves. | |
| 履修取り下げの方法について | How to Apply for Course Withdrawal |
| <「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Apply for a course withdrawal in your School. | |
| 成績評価 | Grading |
| Grades will be based on reports, a midterm examination and a final examination | |
| 不可 (F) と欠席 (W) の基準 | Criteria for "Absent(W)" &"Fail" grades |
| A student will be regarded as ABSENT if he is absent without valid reason from any scheduled tests. A student who has taken the tests but wishes to be considered as ABSENT must contact the instructor by the end of the final examination. | |
| 関連する科目 | Related courses |
| Fundamentals of Physics I, II, III & IV, Science of Materials, Quantum Mechanics I&II, Electricity and Magnetism | |
| 教室 | Class room |

Check the Course Timetable.

到達目標 Goal

The goal of this course is to learn about the crystal structures of solids and their determination by diffraction techniques.

First the different types of atomic bonds are introduced. Then some mechanical properties are discussed, then crystal structures are presented based on a symmetry analysis. The reciprocal lattice is described in relation to the diffraction phenomenon. The relations of the reciprocal lattice with Fourier analysis and plane waves are discussed. Some practical aspects of X-ray diffraction are presented for the cubic crystal system. The amplitude and intensities of diffraction peaks are discussed, introducing structure and form factors.

授業内容 Content

1. Bonding in Solids
2. Crystal Structure and Periodic Structure
3. Bravais Lattices; Famous Crystal Structures
4. Typical Symmetry Elements
5. Real Space and Reciprocal Space
6. X-ray diffraction; Bragg Condition; Laue Function; Ewald sphere
7. Brillouin zone
8. Crystal Structure Factor
9. Structure Determination by X-ray diffraction
10. Elastic properties of solids and elastic strains

教科書 Textbook

Introduction to Solid State Physics (IE), 8th Edition Kittel, Charles/ McEuen, Paul. John Wiley & Sons Inc 2005.(¥ 12,015)

参考書 Recommended reading

Ashcroft&Mermin: Solid State Physics (Brooks/Cole);
P.Hofmann:Solid State Physics, an introduction (Wiley-VCH)

連絡方法 Contact method

NUCT; Email; MS Teams; Zoom

その他 Remarks

*See Course List and Graduation Requirements for your program for your enrollment year.
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