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学部・大学院区分 Undergraduate / Graduate	理学部
時間割コード Registration Code	0680200
科目区分 Course Category	専門科目 Specialized Courses
科目名 【日本語】 Course Title	物性物理学 2
科目名 【英語】 Course Title	Condensed Matter Physics II
コースナンバリングコード Course Numbering Code	
担当教員 【日本語】 Instructor	GELLOZ Bernard Jacques ○
担当教員 【英語】 Instructor	GELLOZ Bernard Jacques ○
単位数 Credits	2
開講期・開講時間帯 Term / Day / Period	春 金曜日 2時限 Spring Fri 2
授業形態 Course style	講義 Lecture
学科・専攻 Department / Program	G30 Physics
必修・選択 Compulsory / Selected	See the "Course List and Graduation Requirements for your program for your enrollment year.

授業の目的 【日本語】 Goals of the Course(JPN)	
授業の目的 【英語】 Goals of the Course	The purpose of this course is to gain a solid understanding of the basic behavior of electrons and atoms in solids and the consequences on the electrical and thermal properties.
到達目標 【日本語】 Objectives of the Course(JPN)	
到達目標 【英語】 Objectives of the Course	The objective of this course is to know the different theories that have been introduced for the understanding of the behavior of electrons and atoms in solids, starting from the most simple approaches and then introducing more advanced theories. Students will then be able to understand the origins and mechanisms of many electrical and thermal properties of materials. The universality of concepts (e.g. quasiparticle behavior; effects of periodicity in the theoretical framework) will be emphasized. The students will master the mathematical tools necessary to describe the items listed in the course content.
授業の内容や構成 Course Content / Plan	<ol style="list-style-type: none"> <li>1. Lattice vibrations; Phonons (semiclassical approach)</li> <li>2. Heat capacity of solids - Classical theory, Einstein model and Debye model</li> <li>3. Thermal conductivity of solids</li> <li>4. Introduction to electron theory of metals; Drude model (i.e. classical approach)</li> <li>5. Free electrons: quantum approach</li> <li>6. Nearly-free electron models; Concept of energy bands; Bloch waves</li> <li>7. Metals; Fermi sphere; Density of states; Electronic specific heat;</li> <li>8. Semiconductors</li> <li>9. Dielectric properties of solids</li> </ol>
履修条件 Course Prerequisites	Condensed Matter Physics I
関連する科目 Related Courses	Condensed Matter Physics I, Fundamentals of Physics I, II, III & IV, Science of Materials, Quantum Mechanics I&II, Electricity and Magnetism.
成績評価の方法と基準 Course Evaluation Method and Criteria	Grades will be based on homework (30%), a midterm examination (30%) and a final examination (40%).
不可(F)と欠席(W)の基準 Criteria for "Fail (F)" & "Absent (W)" grades	Class attendance is required - absentee must give a valid reason (e.g. doctor's certificate). A student will receive the "Absent (W)" grade if his attendance is below 10/15 or he does not sit for an Examination, without valid reason. Otherwise, a student who wishes to receive the "Absent (W)" grade must inform the teacher until the day of the Final Examination.
参考書 Reference Book	Ashcroft&Mermin: Solid State Physics (Brooks/Cole) P. Hofmann: Solid State Physics, an introduction (Wiley-VCH) S. H. Simon, The Oxford Solid State Basics (Oxford University Press)
教科書・テキスト Textbook	Introduction to Solid State Physics (IE), 8th Edition Kittel, Charles/ McEuen, Paul John Wiley & Sons Inc. 2005
課外学習等 (授業時間外学習の指示) Study Load(Self-directed Learning Outside Course Hours)	In general, after a lecture introducing new concepts, a small report will have to be submitted by the following lecture, making a total of about 13 reports. Students should spend a few hours per week to study lecture materials and do the reports.
注意事項 Notice for Students	
他学科聴講の可否 Propriety of Other department student's attendance	
他学科聴講の条件 Conditions for Other department student's attendance	
レベル Level	
キーワード Keyword	
履修の際のアドバイス Advice	
授業開講形態等 Lecture format, etc.	In absence of a completely safe environment, remote classes (live lectures via MS Teams) will be implemented. Otherwise, face-to-face will also be considered. On-demand may be offered as well in special circumstances.
遠隔授業(オンデマンド型)で行う場合の追加措置 Additional measures for remote class (on-demand class)	In remote classes (live lectures via MS Teams), students will be able to ask questions and discuss the lecture content anytime. Additionally, students could have discussions in the NUCT forum.

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