

科目名	Course Title
解析力学1 (Analytical Mechanics I)	
学科・専攻	Department/Program
G30 Physics	
受講年次	Grade
2nd	
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
0680030	Fall semester Wed : 2
単位数	Credit
2	
科目区分	Course type
担当教員	Instructor
重森 正樹 (SHIGEMORI Masaki)	
所属研究室	Laboratory
連絡先	Contact
居室	Room

講義の目的とねらい	Course purpose
<p>This is the first of two courses in analytical mechanics. Analytical mechanics abstracts from Newtonian mechanics and generalizes it to a versatile framework that can be applied to various areas of physics, such as quantum mechanics, statistical mechanics, and relativity. After a survey of elementary principles, we discuss the core concepts of Lagrangian and Hamiltonian mechanics, with special emphasis on symmetry principles, followed by some explicit examples.</p>	
履修要件	Prerequisite
Calculus I & II, Fundamentals of Physics I & II, and concurrent registration of Mathematical Physics I & II	
履修取り下げの方法について	How to Apply for Course Withdrawal
<p>&lt;「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"&gt; Necessary &lt;条件等 Conditions&gt; You may withdraw from the course following the standard procedure of the School of Science.</p>	
成績評価	Grading
Quizzes 10%, homework 30%, midterm 30%, final exam 30%	
不可 (F) と欠席 (W) の基準	Criteria for "Absent(W)" & "Fail" grades
The "Absent" grade is reserved for students who withdraw by the deadline. After that day, a letter grade will be given based on the assessment during the semester.	
関連する科目	Related courses
Analytical Mechanics II, Quantum Mechanics I	

教室	Class room
<p>Check the Course Timetable. Check the course timetable.</p> <p>If the course is given online, join and check the NUCT website for Analytical Mechanics (AM1) for announcements.</p>	
到達目標	Goal
<p>A student who successfully completes this course will be able to:</p> <ul style="list-style-type: none"> <li>- Understand the notions and procedures of the calculus of variations</li> <li>- Write down the Lagrangian of a mechanical system in terms of generalized coordinates and describe its motion using the Euler-Lagrange equations</li> <li>- Understand the relation between symmetries and conservation laws and write down the associated conserved quantities</li> <li>- Describe the motion of mechanical systems using Hamiltonians</li> <li>- Describe motion in central force problem using effective potential</li> </ul>	
授業内容	Content
<ol style="list-style-type: none"> <li>1. Survey of elementary principles</li> <li>2. Variational principles and Lagrangian mechanics</li> <li>3. Symmetries and conservation laws</li> <li>4. Hamiltonian mechanics</li> <li>5. Central force problem</li> </ol>	
教科書	Textbook
<p>H. Goldstein, C. Poole and J. Safko, "Classical Mechanics", Pearson; 3rd edition (2013), ISBN-10: 1292026553, ISBN-13: 978-1292026558</p>	
参考書	Recommended reading
<p>L. D. Landau and E. M. Lifschitz, "Mechanics: Volume 1 (Course of Theoretical Physics)", Butterworth-Heinemann; 3rd edition (1976), ISBN-10: 0750628960, ISBN-13: 978-0750628969.</p> <p>L. N. Hand and J. D. Finch, "Analytical Mechanics", Cambridge University Press (1999), ISBN-10: 0521575729, ISBN-13: 978-0521575720.</p>	
連絡方法	Contact method
<p>Join and check the NUCT website for Analytical Mechanics (AM1) for announcements.</p>	
その他	Remarks
<p>*See Course List and Graduation Requirements for your program for your enrollment year. *See "Course List and Graduation Requirements" for your program for your enrollment year. You are required to register for Physics Tutorial Ia (the tutorial for AM I) concurrently, unless you have passed the course.</p>	