

## シラバス参照

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| 科目ナンバリング                          | TMA-MEE208E                      |
| 開講年度                              | 2024                             |
| 科目名                               | (IMAC-U) 材料力学 I                  |
| 科目名(英語)                           | (IMAC-U)Mechanics of Materials I |
| 単位数                               | 2                                |
| 担当教員                              | 竹田 陽一<br>市川 裕士                   |
| メディア授業科目<br>/Media Class Subjects |                                  |
| 主要授業科目<br>/Essential Subjects     | ○                                |

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| 開講言語                                  |   |
| 授業の<br>目的・<br>概要及び<br>達成方法等           | <p>Google Classroom class code: vemxeyz<br/>(<a href="https://www.eng.tohoku.ac.jp/edu/syllabus-ug.html">https://www.eng.tohoku.ac.jp/edu/syllabus-ug.html</a>)</p> <p>The class code of this course in Google Classroom system is “vemxeyz” in the academic year of 2024 .</p> <p>1. Class subject<br/>Mechanics of materials is a branch of applied mechanics that deals with the basic behavior of solid bodies subjected to various types of loading. The knowledge of the stress and strain set up within the bodies and resulting deflection is a prerequisite for the structural design of industrial products and infrastructures such as buildings, roads, bridges, and various equipments. In this course, the basic idea of the structural design is provide based on the quantitative evaluation of mechanical stress and strain fields in various structures.</p> <p>2. Object and summary of class<br/>This course is intended as an introductory course in the mechanics of solids offered to engineering students. It concentrates on developing analysis techniques from principle for a range of practical problems that include simple structures, pressure vessels, beams and shafts.</p> <p>3. Goal of study<br/>The goal of this course is the acquisition of the basic concept of stress and strain in material s and structures and the quantitative analytical method of stress and strain fields in various structures.</p> |
| 授業の<br>目的・<br>概要及び<br>達成方法等<br>(E)    |   |
| 他の授業<br>科目との<br>関連及び<br>履修上の<br>注意    |   |
| 他の授業<br>科目との<br>関連及び<br>履修上の<br>注意(E) | It is assumed that the students have had some experience in elementary statics (mechanics of rigid bodies) and mathematics (such as differentiation and integration).   |
| 授業計画                                  |   |
| 授業計画<br>(E)                           | <p>1. Introduction: Highly functional and reliable design of structures<br/>2. Basic concept of stress and strain<br/>3. Mechanical properties of materials<br/>4. Hook' s law and strength of materials<br/>5. Two-dimensional stress and strain fields (Pin-jointed structure)<br/>6. Thermal stress and residual stress<br/>7. Thin rings and stress concentration<br/>8. Mid-term exam. 1<br/>9. Biaxial stress and strain fields: Normal stress, shear stress<br/>10. Combined tress field: Principal stress and Mohr's circle<br/>11. Combined tress field: Two-dimensional Hooke's law<br/>12. Torsion: Circular shafts<br/>13. Torsion: Stepped bar, Power transmission<br/>14. Torsion: Thin-walled tube, Rectangular shaft<br/>15. Mid-term exam. 2<br/>16. Final exam</p>  |
| 授業時間外<br>学習                           | ---   |
| 授業時間外<br>学習(E)                        | Homework is assigned at every lecture.  |
| 成績評価<br>方法及び                          |   |

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| 基準   |  |
| 成績評価<br>方法及び<br>基準(E)  | 1. Homework (every lecture): 10%<br>2. Mid-term exams. 1 and 2 (Two-pages of notes are permitted.): 40% (20% each)<br>3. Final exam.(Closed book and no notes): 50%  |
| 教科書<br>および<br>参考書  |  |
| 関連<br>URL  |  |
| 添付<br>ファイル   |  |
| オフィス<br>アワー  |  |
| オフィス<br>アワー(E)   |  |
| 備考   | 1) M. C. Potter, “Strength of Materials, Seventh Ed.”, Schaum’ s Outline Series, McGraw-Hill, (2020).<br>2) S. Timoshenko and D. H. Young, “Elements of Strength of Materials,” Van Nostrand Reinhold Company, (1968).<br>3) Crandall, S. H., T. J. Lardner, and N. C. Dahl, “An Introduction to the Mechanics of Solids. 2nd ed.”, McGraw-Hill, (1999). |
| 実務・<br>実践的授業<br>/Practical<br>business<br>※○は、<br>実務・実践的<br>授業であるこ<br>とを示す。“○”<br>/Note: “○”<br>Indicates<br>the practical<br>business | 主として実践的教育から構成される実務・実践的授業／Practical business  |
| その他  |  |

1単位の授業科目は、45時間の学修を必要とする内容をもって構成することを標準としています。1単位の修得に必要な学修時間の目安は、「講義・演習」については15～30時間に授業および授業時間外学修(予習・復習など)30～15時間、「実験、実習及び実技」については30～45時間の授業および授業時間外学修(予習・復習など)15～0時間です。  
One-credit courses require 45 hours of study. In lecture and exercise-based classes, one credit consists of 15-30 hours of class time and 30-15 hours of preparation and review outside of class. In laboratory, practical skill classes, one credit consists of 30-45 hours of class time and 15-0 hours of preparation and review outside of class.