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| Akashi College | | Year | 2022 | Course Title | Mathematics II B |
| Course Information | | | | | |
| Course Code | 4204 | | Course Category | General / Compulsory | |
| Class Format | Lecture | | Credits | School Credit: 2 | |
| Department | Architecture | | Student Grade | 2nd | |
| Term | Year-round | | Classes per Week | 2 | |
| Textbook and/or Teaching Materials | Linear Algebra | | | | |
| Instructor | TAKATA Isao,SHIGAKI Takahiro | | | | |
| Course Objectives | | | | | |
| 1. Can compute vectors and apply them to shapes. 2. Understand the definition of matrices, and can perform matrix computations and solve simultaneous linear equations. 3. Understand the definition and properties of determinants, and can calculate the values of basic ones. | | | | | |
| Rubric | | | | | |
| | Ideal Level | | Standard Level | | Unacceptable Level |
| Achievement 1 | Can fully compute vectors and apply them to shapes. | | Can compute vectors and apply them to shapes. | | Cannot compute vectors and apply them to shapes. |
| Achievement 2 | Fully understand the definition of matrices, and can fully perform matrix computations and solve simultaneous linear equations. | | Understand the definition of matrices, and can perform matrix computations and solve simultaneous linear equations. | | Do not understand the definition, and cannot perform matrix computations and solve simultaneous linear equations. |
| Achievement 3 | Fully understand the definition and properties of determinants, and can fully calculate the values of basic ones. | | Understand the definition and properties of determinants, and can calculate the values of basic ones. | | Do not understand the definition and properties of determinants, and cannot calculate the values of basic ones. |
| Assigned Department Objectives | | | | | |
| Teaching Method | | | | | |
| Outline | Classes and exercises will be given on the basics of linear algebra, which is used in a wide range of fields. The goal is to become able to relate computation to geometry by using equations for shapes in a plane or in space | | | | |
| Style | In the first semester, students will be asked to prepare for the lesson using videos along the syllabus, and to have them study in groups during the lesson. In the second semester, there will be lecture-style classes, tests at appropriate times, and report assignments. Takata is in charge of the first half, and Shigaki (Omeda is the liaison) in the second half. | | | | |
| Notice | Try to understand the material thoroughly during the classes. Make an effort to always ask about things that are unclear, and solve them then and there. Also, always review the material on the same day, and do the problem exercises properly. Students who miss 1/3 or more of classes will not be eligible for a passing grade. | | | | |
| Characteristics of Class / Division in Learning | | | | | |
| <input checked="" type="checkbox"/> Active Learning | | <input checked="" type="checkbox"/> Aided by ICT | | <input checked="" type="checkbox"/> Applicable to Remote Class <input type="checkbox"/> Instructor Professionally Experienced | |
| Course Plan | | | | | |
| | | | Theme | Goals | |
| 1st Semester r | 1st Quarter | 1st | vectors | Can perform basic vector operations. | |
| | | 2nd | vectors | Can calculate the inner product of vectors. | |
| | | 3rd | vectors | Can represent the components of vectors. | |
| | | 4th | vectors | Can represent the components of the space vectors. | |
| | | 5th | vectors | Can calculate the area of the parallelogram by using a matrix. | |
| | | 6th | vectors | Can understand parallel and vertical conditions. | |
| | | 7th | vectors | Can obtain the straight line vector equation. | |
| | | 8th | vectors | Can understand and calculate the outer product. | |
| | 2nd Quarter | 9th | vectors | Can obtain the equation of a plane. | |
| | | 10th | vectors | Can calculate the distance between a point and a plane. | |
| | | 11th | vectors | Can obtain the equation of the sphere. | |
| | | 12th | Matrices | Can calculate the sum, difference, and product of matrices. | |
| | | 13th | Matrices | Can use the distributive and associative laws of matrices. | |
| | | 14th | Matrices | Can understand and use zero and identity matrices. | |
| | | 15th | Matrices | Can obtain the transposed matrix and the inverse matrix. | |
| | | 16th | Final exam | To check what you have learned so far. | |
| 2nd Semester r | 3rd Quarter | 1st | Simultaneous linear equations and matrices | | Understand the elimination method. |

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| | | 2nd | Simultaneous linear equations and matrices | Can solve simultaneous equations using the elimination method. |
| | | 3rd | Simultaneous linear equations and matrices | Can solve simultaneous equations using inverse matrices. |
| | | 4th | Simultaneous linear equations and matrices | Can compute the rank of a matrix. |
| | | 5th | Definition and properties of determinants | Understand the definition of determinants. |
| | | 6th | Definition and properties of determinants | Can compute determinants. |
| | | 7th | Overall | Can solve problems related to the content thus far. |
| | | 8th | Midterm exam | |
| | 4th Quarter | 9th | Definition and properties of determinants | Can compute determinants using their properties. |
| | | 10th | Definition and properties of determinants | Can compute the determinants of products of matrices. |
| | | 11th | Applications of determinants | Can expand determinants. |
| | | 12th | Applications of determinants | Can compute inverse matrices using determinants. |
| | | 13th | Applications of determinants | Can investigate the properties of simultaneous equations using determinants. |
| | | 14th | Applications of determinants | Understand the geometric meaning of determinants. |
| | | 15th | Overall | Can solve problems related to the content thus far. |
| | | 16th | Final exam | |

Evaluation Method and Weight (%)

| | Examination(fir st half) | Review quiz(first half) | assignments(fir st half) | Attendance(firs t half) | Examination(se cond half) | Quizzes and tsks(second half) | Total |
|----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|------------------------------|-------------------------------------|-------|
| Subtotal | 23 | 12 | 8 | 7 | 30 | 20 | 100 |
| Basic Proficiency | 23 | 12 | 8 | 7 | 30 | 20 | 100 |
| Specialized Proficiency | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cross Area Proficiency | 0 | 0 | 0 | 0 | 0 | 0 | 0 |