Linear Algebra I

Registration code	0061211	**Credits**	2.0
Course Category	Sciences Basic	**Class room**	A11
Term(Semester)/Day/Period	Ⅰ(First Year, First Semester) / Mon / 2（10:30～12:00）		
Instructor	DARPÖ Erik		
Target Schools (Programs)	Le(J)・La(S)・Ec(S)・Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●**Aim of the course**

Linearity one of the most fundamental concepts for the handling of quantities in current natural science. Indispensable in quantum mechanics and relativity, its use has spread across all branches of natural science and beyond. Linear algebra, developed in the nineteenth century, is the mathematical theory of linearity. The first half of this one-year course focuses on the techniques for manipulating systems of linear equations and their application to analytic geometry (in arbitrary dimensions). Emphasis is placed on the ability to think abstractly.

●**Course Prerequisites**

Ability to deal with systems of linear equations and to do elementary geometry in the plane can help.

●**Outline of lectures**

I) Geometric setting

Points and vectors in R^n, located vectors in R^n, norm and scalar product in R^n, parametric representation of lines, planes and hyperplanes.

II) Systems of linear equations

Systems of linear equations, row operations and Gaussian elimination.

III) Vector subspaces

Definition, linear combinations, linear independence of vectors, dimension of a subspace.

IV) Linear maps and matrices

Linear maps, matrices associated with linear maps, inverse, elementary matrices and Gaussian elimination for matrices. Kernel and image (range) of linear maps, rank of linear maps and matrices, composition of linear maps.

●**Course Evaluation Methods**

There will be two main, written exams: midterm (35%) and final (45%). Additionally, the will be homework assignments (10%) and quizzes (10%). The final grade will be determined by the total amount of points obtained according to the following scale: S: 90-100, A: 80-89, B: 70-79, C: 60-69, F:0-59.

●**Notice for Students**

The Reference Book is available in the Main library and in the Science library (enough copies in total for all students).

It is **strongly** recommended to also follow the course Mathematics Tutorial I b.

Textbook	---
Reference Book	***Linear Algebra with Applications***, fourth edition, Otto Bretscher, Edition: Pearson

Fundamentals of Biology I

Registration code	0061311	**Credits**	2.0
Course Category	Sciences Basic	**Classroom**	A21
Term(Semester)/Day/Period	I (First Year, First Semester) / Mon / 3（13:00～14:30）		
Instructor	CARTAGENA Joyce Abad		
Contact	Office: Rm. B508A, Building B, Graduate School of Bioagricultural Sciences Phone: 052-789-5209 / Mobile: 09082038167 (for emergency only) Email: joyce@agr.nagoya-u.ac.jp		
Office hours:	Wednesdays 3:00-6:00 pm Fridays 3:00-6:00 pm *Email or call me for appointments outside office hours.		
Target Schools (Programs)	Sc (P・C・B)・En (P・C・Au)・Ag (B)		

●Aim of the course

The aim of this course is to introduce the key concepts of basic biology. In order to understand life, we have to understand the molecular processes that occur in and around cells, from energy procurement to reproduction and gene expression. Through such processes, living things go through evolution giving rise to biological diversity.

●Course Prerequisites

None

●Course Content

I. THE LIFE OF THE CELL
1. Biology: Exploring Life
2. The Chemical Basis of Life
3. The Molecules of Cells
4. A Tour of the Cell
5. The Working Cell
6. How Cells Harvest Chemical Energy
7. Photosynthesis: Using Light to Make Food

II. CELLULAR REPRODUCTION AND GENETICS
8. The Cellular Basis of Reproduction and Inheritance
9. Patterns of Inheritance
10. Molecular Biology of the Gene
11. How Genes Are Controlled
12. DNA Technology and Genomics

III. CONCEPTS OF EVOLUTION
13. The Origin of Species
14. Tracing Evolutionary History
15. How Populations Evolve

IV. THE EVOLUTION OF BIOLOGICAL DIVERSITY
16. Microbial Life: Prokaryotes and Protists
17. The Evolution of Plant and Fungal Diversity
18. The Evolution of Invertebrate Diversity
19. The Evolution of Vertebrate Diversity

●Course Evaluation Methods

Activity	Percentage of final grade
In-class participation (includes recitation/class discussions)	25
Home works and Quizzes	25
Examinations	50

●Notice for Students

1. Course webpage
   NUCT (Nagoya University Collaboration and Course Tools) is an online system that will be used for this course. Home works will be accessible through this page as well as extra learning materials that I will be uploading. Moreover, this webpage will also be used as a venue for us to communicate.
   https://ct.nagoya-u.ac.jp/portal
2. Attendance
   If you cannot attend class, you should contact me as soon as possible either by email or phone. Attendance will not be graded but missing class would mean missing possible points from recitation.
3. Make-up exam
   Make-up exams may be given on condition that the student can provide acceptable reasons for his/her absence.
4. Personal electronics policy
   Personal electronic devices should not be visible or audible during class time.
5. Academic honesty and original work
   Cheating and copying (including plagiarism) will not be tolerated in this class.
6. Course Withdrawal
   Students who wish to withdraw from the course will have to submit a duly accomplished Course Withdrawal Request by November 21, 2016.

Textbook	Campbell Biology Concepts and Connections 8/e 2015 (Pearson New International Edition) *or older edition Authors: J. Reece, M. Taylor, E. Simon, J. Dickey
Reference Book	---

Fundamentals of Earth Science I

Registration code	0061411	**Credits**	2.0
Course Category	Sciences Basic	**Classroom**	A11
Term(Semester)/Day/Period	Ⅰ(First Year, First Semester) / Mon / 4（14:45～16:15）		
Instructor	HUMBLET Marc Andre		
Contact	Office: Graduate School of Environmental Studies Department of Earth and Planetary Sciences E516 Phone: 052-789-3037 Email: humblet.marc@f.mbox.nagoya-u.ac.jp		
Target Schools (Programs)	Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●Aim of the course

The study of planet Earth embraces a wide range of topics, from the formation of rocks to the evolution of life. In this course, we will talk about plate tectonics, the fundamental theory underlying all geological processes which have shaped the environment in which we live and continue to modify the landscape, from the slow and progressive uplift of mountain chains to violent earthquakes and volcanic eruptions. The students will learn how the Earth recycles matter and how minerals and rocks form and are transformed. One chapter of the course is dedicated to the issue of time, central in earth science, and tackles the question of how the age of rocks and geological events can be determined. We will then take a step back and look at Earth's 4.5 billion year history to see how the Earth's geography has changed and how life has evolved.

Besides providing a basic and up-to-date knowledge of the essential concepts of earth sciences, the aim of this course is to stimulate the interest and curiosity of the students for the study of planet Earth and provoke questions, comments, and discussions about issues related to earth sciences.

●Content of the course

1. Earth Sciences: an introduction
2. The solar system
3. Plate tectonics
4. Minerals: rock's elementary building blocks
5. Rocks and rock cycle I: igneous rocks
6. Rocks and rock cycle II: sedimentary rocks
7. Rocks and rock cycle III: metamorphic rocks
8. The age of rocks
9. Earth history I: paleogeography
10. Earth history II: origin and evolution of life

●Practical classes

The students will examine hand-size rock samples and rock thin sections chosen to illustrate the different rock types and geological structures seen during the course. In addition, the students will also participate in a one-day field trip to examine the geology of Mizunami area (Gifu Prefecture), examine Miocene fossils and sediments (20-15 million years old), and learn how geologists collect data in the field.

●Grading

Two quizzes (multiple choice): 20% (10% each)
Mid-term exam: 40%
Final exam: 40%
Students will be graded following the five-step S-A-B-C-F grade evaluation system.
S: 90-100%, A: 80-89%, B: 70-79%, C:60-69%, F: 59-0%
A student will be given an "Absent" grade if he or she submits a Course Withdrawal Request by the 15th of November. This deadline does not apply to students who drop the class part-way through for an exceptional reason (e.g. illness, accident).

●Notice for Students

Handouts of lecture notes and slides will be distributed during the class. Students can refer to the reference books indicated if they wish to have complementary information about the subjects covered by the course. The books are available at the science library.

Textbook	---
Reference Books	John Grotzinger, Understanding Earth 6/e (ISBN:9781429240031 or 9781429219518) Diane Carlson, Physical Geology International Edition (ISBN:9780071221849)

Fundamentals of Physics I

Registration code	0062211	**Credits**	2.0
Course Category	Sciences Basic	**Classroom**	Tue-C25 / Thu-A21
Term(Semester)/Day/Period	Ⅰ(First Year, First Semester) / Tue, Thu / 2（10:30～12:00）		
Instructor	FOONG See Kit		
Contact	Email: skfoong@eken.phys.nagoya-u.ac.jp		
Target Schools (Programs)	Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●Aim of the course

Fundamentals of Physics I (FP I) is the first of four lecture courses (FP I-IV) designed to cover the basic classical physics that provide a firm foundation in learning science and engineering. This course introduces the concepts and laws of classical mechanics. Further topics in mechanics will be covered in FP II.

●Course Prerequisites

Students without a good background in high school physics and basic calculus are advised to review those materials as soon as possible and would be expected to have to spend more time and effort for the course, which must be considered when deciding your course load. Students are expected to participate actively in class activities throughout the course.

●Course Content

The topics include kinematics, vectors, force and motion, energy, work and momentum, and are based on the following chapters in the textbook:

Chapter 2: Motion Along a Straight Line
Chapter 3: Vector
Chapter 4: Motion in Two and Three Dimensions
Chapter 5: Force and Motion I
Chapter 6: Force and Motion II
Chapter 7: Kinetic Energy and Work
Chapter 8: Potential Energy and Conservation of Energy
Chapter 9: Center of Mass and Linear Momentum

Problem solving involving the applications of the concepts and laws will be discussed in lectures, but the companion course - Fundamental Physics Tutorial Ia - is designed to develop students' problem solving skills.

●Course Evaluation Methods

Class attendance: 5% Continuous Assessment: 15% Mid-Term Exam: 30% Final Exam: 50%

Class attendance is required. Absentee must give a valid reason supported by documents. The ABSENT grade will be assigned when a) your attendance is below 75%, OR b) you are absent without valid reason from the Mid-Term Exam or Final Exam., OR c) you wish to receive the ABSENT grade (In this case, you must see the instructor immediately after the Final Exam.)

●Notice for Students

Concurrent registration of Fundamental Physics Tutorial Ia is required. Students who receive the ABSENT grade for the course are not qualified to take the Repeat Exam.

Textbook	Principles of Physics, Extended 9th or 10th Edition International Student Version with WileyPLUS Set (John Wiley & Sons), ISBN (9th Ed): 9780470561584; ISBN(10th Ed): 9781118230749
Reference Books	1.The physics of everyday phenomena, a conceptual introduction to physics by W.T.Griffith and J.W. Brosing (McGraw-Hill, 8th Ed 2014) 2.Force + Motion, an illustrated guide to Newton's laws by Jason Zimba (John Hopkins University Press, 2009) 3. Fundamentals of Physics 8/E Student Solutions Manual by J. R. Christman (Wiley, 2008) 4. Feynman Lectures On Physics (Vol.1) by Richard P. Feynman (Pearson P T R)

Fundamentals of Physics II

Registration code		0064211	**Credits**	2.0
Course Category		Sciences Basic	**Classroom**	Tue-C25 / Thu-A21
Term(Semester)/Day/Period		I (First Year, First Semester) / Tue, Thu / 2（10:30～12:00）		
Instructor		TAMA Florence Muriel	GELLOZ Bernard Jacques	
Contact	**Office**	ITbM Building / 3rd floor	Eng.Bld3, North wing 431	
	Phone	---	052-789-4202	
	Email	florence.tama@nagoya-u.jp	gelloz@nuap.nagoya-u.ac.jp	
Office Hours		TBA		
Target Schools (Programs)		Sc(P・C・B)・En(P・C・Au)・Ag(B)		

Fundamentals of Physics II (Classical Mechanics II and Thermal Physics)

●Aim of the course

Physics is at the foundation of science and engineering. This is the second of a series of four courses that cover the fundamentals of physics. The first 2/3 of this course covers further topics in mechanics: equilibrium and elasticity, gravitation, oscillations and the remaining 1/3 of the course introduces thermal physics. Besides learning to solve problems within each topic, students will also learn to solve problems that cut across these topics.

●Course Prerequisites

-To take Fundamentals of Physics II, you must also enroll in Fundamentals of Physics I. (You cannot study Fundamentals of Physics II without taking Fundamentals of Physics I first.) -Note that this course commences after Fundamentals of Physics I; nevertheless, you must register for it during the normal registration period in the first few weeks of semester. -Concurrent registration for Fundamental Physics Tutorial is required. -Students are expected to participate actively in class activities throughout the course. Students without a good background in high school physics and basic calculus are expected to have to spend more time in this course, and are advised to take this into consideration when deciding their course load.

●Course Content

Chapter 10: Rotation
Chapter 11: Rolling, Torque, and Angular Momentum
Chapter 12: Equilibrium
Chapter 13: Gravitation
Chapter 15: Oscillations
Chapter 18: Temperature, Heat, and the First Law of Thermodynamics
Chapter 19: The Kinetic Theory of Gases
Chapter 20: Entropy and the Second Law of Thermodynamics

●Course Evaluation Methods

Class attendance is required. Absentees must give a valid reason (e.g. doctor's certificate).
The "Absent" grade is reserved for students who withdraw just after the final exam. After that day, a letter grade will be awarded based on marks earned from all assessment during the semester.
Class attendance: 5%; Assignments: 15%; Intermediate tests: 40%; Final Exam: 40%

●Notice for Students

Students gain a functional understanding of introductory mechanics and thermal physics. They are able to solve problems that may cut across the topics, and are able to appreciate the physics underlying their studies in other science and engineering disciplines. They are prepared for the next course in the series: Fundamentals of Physics III.

Related courses: Calculus I, Calculus II, Linear Algebra I, Linear Algebra II, Fundamentals of Physics I, III & IV.

Textbook	Fundamentals of Physics Extended 10th Edition International Student Version with WileyPLUS Set (John Wiley & Sons, 2010 ISBN: 9781118230749)
Reference Book	Feynman Lectures in Physics (Vol.1) by Richard Feynman (Pearson P T R)

Fundamentals of Chemistry I

Registration code	0063311	**Credits**	2.0
Course Category	Sciences Basic	**Classroom**	A31
Term (Semester)/Day/Period	I (First Year, First Semester) / Wed / 3（13:00 – 14:30）		
Instructor	BUTKO Peter		
Contact	Office: SA Building-318-1 (Science & Agriculture) Phone: 052-789-2480 Email: pbutko@chem.nagoya-u.ac.jp		
Target Schools (Programs)	Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●Course Purpose

The purpose of this course is to grasp what chemistry is all about and to learn important principles and facts in chemistry. The course begins with atomic structure, proceeds next to bonding and molecules, and further to bulk physical properties of substances.

●Course Contents

1 Chemistry: Matter and Measurement (Ch. 1)
2 Atoms, Molecules and Ions (Ch. 2)
3 Mass Relationships in Chemical Reactions (Ch. 3)
4 Reactions in Aqueous Solutions (Ch. 4)
5 Pre-exam Review & **EXAM 1 (Chs. 1 – 4)**
6 Periodicity & the Electronic Structure of Atoms (Ch. 5)
7 Ionic Bonds & Some Main-Group Chemistry (Ch. 6)
8 Covalent Bonds and Molecular Structure (Ch. 7)
9 Thermochemistry: Chemical Energy (Ch. 8)
10 Pre-exam Review & **EXAM 2 (Chs. 5 – 8)**
11 Gases: Their Properties and Behavior (Ch. 9)
12 Liquids, Solids, and Phase Changes (Ch. 10)
13 Solutions and Their Properties (Ch. 11)
14 Pre-final Review
15 FINAL EXAM (Chs. 1 – 11)

●Grading

Two Exams: 100 points each. Final Exam (comprehensive): 200. Homework: 50. TOTAL: 450.
Grade "S": 100-90% (405 or more points), "A": 89-80% (404 - 360 pts), "B": 79-70% (359 - 315 pts), "C": 69-60% (314 - 270 pts), "F": 59-0% (fewer than 270 pts).

●Course Withdrawal

Yes. The last day to withdraw without academic penalty is the last class day in November.

●Criteria for "Absent" & "Fail" Grades

The "Absent" grade is reserved for students that withdraw by last class day in November. After that day, a letter grade will be awarded based on grades earned from all assignments during the semester.

●Prerequisite

None

●Related Courses

Textbook	Chemistry (J. McMurry and R.C. Fay), 7th Ed. (Global Edition, bundled with Mastering Chemistry) Pearson, 2016
Reference Book	Chemistry (J. McMurry and R.C. Fay)6th Ed. International Edition, bundled with Mastering Chemistry（without Etext）￥9,950
Remarks	It is essential to sit in each exam during the scheduled class time. **There will be NO make-up exam.** In the event of a missed exam due to a serious illness, accident or family emergency, compelling **written** documentation of the reason for the absence will be required. If the reason is accepted, the final grade will be calculated from the appropriately weighted average from the rest of the exams. If the reason will be deemed insufficient, the absence will be unexcused, and zero points will be awarded for the missed exam. **WARNING: Missing more than one exam (it does not matter whether excused or not) means automatically failing the course.** **Attendance** is necessary for successful completion of this course. No points will be awarded for attending lectures, but attendance may be taken. Sleeping in the lecture hall will be actively discouraged. **Homework** is crucial for mastering new material and developing skills in applying concepts. Weekly homework will be either on paper or electronic. Homework is due at the beginning of class on the due date. **A general guideline says an average of 2 to 3 hours of study time per week is necessary for each 1 credit hour.** **Exams** focus on problem solving, and exam questions will be similar to the homework problems. Exam grades will be posted in the Gradebook on the Course website before next class period. **Cell phones** must be turned off during lecture.

Pre-college Mathematics ＊Optional subject

Registration code	0063411	**Credits**	2.0
Course Category	Sciences Basic	**Classroom**	C10
Term(Semester)/Day/Period	Ⅰ(First Year, First Semester) / Wed / 4（14:45～16:15）		
Instructor	RICHARD Serge Charles		
Contact	Office: Room 237, Science Building A Email: richard@math.nagoya-u.ac.jp Web site : http://www.math.nagoya-u.ac.jp/~richard/fall2016.html		
Target Schools (Programs)	Le(J)・La(S)・Ec(S)・Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●Aim of the course

This course is a companion course to Calculus I. It aims to help students with little or no precalculus knowledge to master the basic calculus material in preparation for the more advanced course of Calculus I.

●Course Prerequisites

No prerequisites.

●Course Content

The content of this course will depend on the initial level in mathematics of the students attending it. It will mainly consist in a review of high school mathematics and in an additional help for students attending the course Calculus I.

●Course Evaluation Methods

Your final grade will be determined by your active participation during the lectures.

●Notice for Student

This course in an optional subject which does not count towards the number of credits required for graduation in any program at Nagoya University.

Textbook	---
Reference Book	---

Calculus I

Registration code	0064511	**Credits**	2.0
Course Category	Sciences Basic	**Classroom**	C14
Term(Semester)/Day/Period	Ⅰ(First year, First semester) / Thu / 5（16:30～18:00）		
Instructor	RICHARD Serge Charles		
Contact	Office: Room 237, Science Building A Email: richard@math.nagoya-u.ac.jp Web site : http://www.math.nagoya-u.ac.jp/~richard/fall2016.html		
Target Schools (Programs)	Le(J)・La(S)・Ec(S)・Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●Aim of the course

Analysis is the field of mathematics that describes and analyzes quantitative changes, and the central methods are differential and integral calculus. These methods are essential techniques in natural science, and have recently found increasing applications also in social sciences. The aim of the first half of this one-year course is to provide a solid understanding of functions of a single variable.

●Course Prerequisites

Some basic knowledge on calculus from high school is assumed, including differentiation and integration of polynomial functions.

●Course Content

1. Limits and continuity
   Basic properties of limits of sequences and functions, continuous functions and their basic properties, maxima and minima, asymptotic properties of functions.
2. Differentiation
   Basic properties of the derivative and its interpretation, mean value theorem, higher derivatives, Taylor series.
3. Integration
   Riemann integral and its properties, improper integrals, the fundamental theorem of calculus.

●Course Evaluation Methods

The final grade will be determined by quizzes (30%), the midterm (30%) and a final exam (40%).

●Notice for Students :

This course uses the course withdrawal system. To withdraw from the course and obtain the grade Absent the student must submit a written Course Withdrawal Request before the end of November. After that time any student who participated in any part of the examination will be graded S, A, B, C or F.

Textbook	--
Reference Book	--