Linear Algebra I

Registration Code	0061211	**Credits**	2.0
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-I (1st year, Fall Semester) / Mon. / 2（10:30～12:00）		
Instructor	DARPÖ Erik Olof		
Target Schools (Programs)	Hu(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 techniques for manipulating systems of linear equations, and the application of these techniques to analytic geometry (in arbitrary dimensions). Emphasis is placed on the ability to think abstractly.

●Prerequisites

No formal prerequisites. Some ability to manipulate systems of linear equations, and understanding of elementary geometry will be useful for the understanding of the course material.

●Course contents

Linear systems, matrices, vectors, linear maps, matrix multiplication, the inverse of a linear map, subspaces of R^n, image and kernel, linear independence, bases, dimension, coordinates, orthogonal bases, the Gram–Schmidt algorithm, QR factorisation, orthogonal complement, orthogonal maps, least square approximations.

●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.

Students do not need to submit a Course Withdrawal Form for course withdrawal. Anyone who does not attend the final exam will receive the grade ”Absent”.

●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	None
Reference Book	Otto Bretscher: ***Linear Algebra with Applications***, fourth edition, Pearson 2009. *ISBN: 978-0-13-600926-9*

Fundamentals of Chemistry I

Registration Code	0061311	**Credits**	2.0
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-I (1st year, Fall Semester) / Mon. / 3（13:00～14:30）		
Instructor	BUTKO Peter		
Target Schools (Programs)	Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●Aim of the course

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.

●Prerequisites

None

●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)

●Evaluation methods

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.

●Notice for students

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.	
Textbook	Chemistry (J. McMurry and R.C. Fay), 7th Ed. (Global Edition E-Text, bundled with Mastering Chemistry) Pearson, 2016, approximately ￥4,500
Reference Book	Chemistry (J. McMurry and R.C. Fay), 6th Ed., International Edition, bundled with Mastering Chemistry (without E-text) ￥9,950

Fundamentals of Earth Science I

Registration Code	0061411	**Credits**	2.0
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-I (1st year, Fall Semester) / Mon. / 4（14:45～16:15）		
Instructor	HUMBLET Marc Andre		
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, from continental drift to the study of earthquakes and volcanoes. In this course, fundamental concepts of earth science will be covered. Students will be introduced to plate tectonics, the fundamental theory underlying the geological processes which have shaped the environment in which we live and continue to modify the landscape, from the slow, progressive uplift of mountains to violent earthquakes and volcanic eruptions. Students will learn how the Earth recycles matter and how minerals and rocks form and are transformed. One chapter is dedicated to the issue of time, more specifically the question of how the age of rocks and geological events can be determined, which is central to earth science. 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 science, 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 science.

●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

Four quizzes (multiple choice and short-answer questions): each worth 25% of the final grade
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 Book	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		
Term (Semester) / Day / Period	G-I (1st year, Fall Quarter 1) / Tue., Thu. / 2（10:30～12:00）		
Instructor	FOONG See Kit		
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 to provide a firm foundation for learning science and engineering. This course introduces the concepts and laws of classical mechanics. Further topics in mechanics will be covered in FP II.

●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 spend more time and effort for the course. This must be considered when deciding your course load. Students are expected to participate actively in class activities throughout the course.

●Course contents

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

Examples of problem solving will be discussed in lectures, but the companion course - Fundamental Physics Tutorial Ia - is designed to develop students' problem solving skills.

●Evaluation methods

Class participation: 10%　Lecture Assignment: 10%　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.) Note: Students who receive the ABSENT grade for the course are not qualified to take the Repeat Exam.

●Notice for students

Concurrent registration of Fundamental Physics Tutorial Ia is strongly advised because it is necessary for mastering the content of the lectures.

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 Book	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 PTR)

Fundamentals of Physics II

Registration Code	0062212	**Credits**	2.0
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-I (1st year, Fall Quarter 2) / Tue., Thu. / 2（10:30～12:00）		
Instructor	TAMA Florence Muriel, GELLOZ Bernard Jacques		
Target Schools (Programs)	Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●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.

●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 contents

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

●Evaluation methods

Class attendance is required. Absentees must give a valid reason (e.g. doctor's certificate). Students need to submit a Course Withdrawal Request Form when requesting course withdrawal. 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, 2014 ISBN: 9781118230749)
Reference Book	Feynman Lectures in Physics (Vol.1) by Richard Feynman (Pearson P T R)

Fundamentals of Biology I

Registration Code	0063311	**Credits**	2.0
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-I (1st year, Fall Semester) / Wed. / 3（13:00～14:30）		
Instructor	CARTAGENA Joyce Abad		
Target Schools (Programs)	Sc (P･C･B)･En (P･C･Au)･Ag (B)		

●Aim of the course

The objective of this course is to introduce the key concepts of basic biology and provide the foundation for specialized courses. Furthermore, this course aims to encourage students to think like scientists and develop scientific reasoning and literacy skills.

●Prerequisites

None

●Course contents

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

VI. PLANTS: FORM AND FUNCTION
31. Plant Structure, Growth, and Reproduction
32. Plant Nutrition and Transport
33. Control Systems in Plants

●Evaluation methods

Attendance and class participation 30%
Home works 20%
Examinations 50%

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●Notice for students

1. Course webpage
NUCT (Nagoya University Collaboration and Course Tools; https://ct.nagoya-u.ac.jp/portal) is an online system that will be used for this course. PowerPoint slides, other learning materials (such as videos, websites, etc.) and home works will be accessible through this page.

2. Attendance
If you cannot attend class, you should contact the instructor as soon as possible either by email or phone.

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 26, 2018.

7. Work load
Students are expected to read one to two chapters of the textbook every week, and come to class prepared for discussion.

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	

Pre-college Mathematics

Registration Code	0063411	**Credits**	2.0
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-I (1st year, Fall Semester) / Wed. / 4（14:45～16:15）		
Instructor	RICHARD Serge Charles		
Target Schools (Programs)	Hu(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. It is necessary to submit a Course Withdrawal Request Form when a student has no intention of finishing the course during the semester.

●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	---

Special Mathematics Lecture (Differential Geometry)

Registration Code	0063611	**Credits**	2.0
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-I (1st year, Fall Semester) / Wed. / 6（18:15～19:45）		
Instructor	RICHARD Serge Charles		
Target Schools (Programs)	Hu(J)・La(S)・Ec(S)・Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●Aim of the course

Differential geometry plays a central role in many physical theory, as for example in classical mechanics, in solid states physics or in general relativity. During this one semester course, many essential notions will be introduced, among them the definitions of a manifold, of the curvature, of the parallel transport, of the holonomy, etc. Depending on the interest of the audience, applications in one of the mentioned theory will be proposed.

●Course Prerequisites

Basic knowledge on calculus and linear algebra, as provided in Calculus I & II and in Linear algebra I & II. Motivated 1st year students can also attend without these prerequisites but after a discussion with the instructor.

●Course Content (provisional)

1. Manifolds and submanifolds, Riemannian manifolds
2. Connections, parallel transport
3. Geodesics
4. Curvature
5. Homology theory

●Course Evaluation Methods

The final grade will be determined by the active participation during the lectures (as explained during the first lecture).

●Notice for Students :

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	Material will be provided during the lectures
Reference Book	Reference books will be provided during the lectures

Calculus I

Registration Code	0064511	**Credits**	2.0
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-I (1st year, Fall Semester) / Thu. / 5（16:30～18:00）		
Instructor	RICHARD Serge Charles		
Target Schools (Programs)	Hu(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.

Web site : http://www.math.nagoya-u.ac.jp/~richard/fall2018.html

Textbook	---
Reference Book	---

Complex Analysis

Registration Code	0061531	**Credits**	2.0
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-III (2nd year, Fall Semester) / Mon. / 5（16:30～18:00）		
Instructor	DEMONET Laurent		
Target Schools (Programs)	Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●Aim of the course

Complex analysis appears in many areas of the natural sciences and has wide applications. The calculus of complex functions of one variable is very different from the calculus of real functions of one variable. The notion of a complex analytic (or holomorphic) function of one variable is much more rigid than the notion of a real differentiable function of one variable. These functions give rise to a very rich and beautiful mathematical theory with numerous applications in mathematics and beyond. The course gives an introduction to the basic elements of this theory with an emphasis on complex line integrals.

●Prerequisites

Calculus corresponding to Calculus I and II. Even if it is not a formal prerequisite, we highly recommend to take Complex Analysis after having passed Calculus I and II. In particular, it is very unlikely to success at Complex Analysis after having failed Calculus I or II.

●Course contents

Complex numbers

The aim of this part is to get familiar with complex numbers. Complex numbers appear naturally to solve polynomial equations with real coefficients and are foundational for complex analysis.

1 – The complex number system
2 – Properties of complex numbers, geometric representation (Cartesian form, polar form)

Analytic functions

The aim of this part is to get familiar with the main features of complex functions (in particular differentiable functions). We will emphasize the link with functions from the real plane to itself.

3 – Elementary functions (exponential, logarithm, trigonometric functions)
4 – Continuous functions
5 – Analytic functions, Cauchy-Riemann's equation
6 – Differentials of elementary functions

Integrals

Complex line integrals have the noticeable property to be (in a certain sense) independent of the choice of the line and to depend mostly on the end points of the line. We will focus on the study of this behavior.

7 – Line and contour integrals
8 – Cauchy's theorem I
9 – Cauchy's theorem II
10 – Cauchy's integral formula

Residues

The residue calculus is a powerful tool to evaluate in practice integrals along curves in the complex plane. We will mostly focus on applications.

11 – Overview of power series and Laurent series
12 – Overview of calculation of residues

●Evaluation methods

There will be two main exams: midterm (40%) and final (50%) and twelve quizzes about problems given the lecture before (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.

Students who are absent to the final examination will receive a grade “Absent”. **Students do not need to submit a Course Withdrawal Form for course withdrawal.**

●Notice for students **This course is particularly demanding compared to first year's ones. It requires a rather good understanding of the concepts introduced in first year (especially in Calculus I and II). It is not recommended to take this course before having passed at least three of the first year courses of mathematics.**	
Textbook	**None**
Reference Book	***Fundamentals of Complex Analysis, with Applications to Engineering and Science***, third edition E. B. Saff, A. D. Snider Editor: Pearson Education, New Jersey ***Basic Complex Analysis***, third edition **J. E. Marsden, M. J. Hoffman Editor: W. H. Freeman, New York.**

Laboratory in Physics

Registration Code	0063331	**Credits**	1.5
Course Category	Sciences Basic		
Term (Semester) / Day / Period	G-III(2nd Year, Fall Semester) / Wed. / 3(13:00～14:30), 4(14:45～16:15)		
Instructor	NAKATSUKA Osamu, NAKAMURA Shinichiro, GELLOZ Bernard Jacques, ISHIBASHI Kazunori, OYABU Shinki,		
Target Schools (Programs)	Sc(P・C・B)・En(P・C・Au)・Ag(B)		

●Aim of the course

The goal of this course is to improve your understanding of the theory behind physical values and phenomena on the basis of measurements and observations, and to help you master experimental techniques such as basics, methods, and principles of measurement by using various types of equipment. Concurrently, practice assignments related to the experiments are given to facilitate understanding of data analysis and writing of reports. There is a historical, intellectual, social, and technical background behind each subject covered in the experiments. The experimental equipment and methodologies covered in this course can be applied in the majority of fields related to natural science. Hence, students interested in physics as well as those majoring in other fields will discover the applicability of the lessons learned in their major through laboratory experiments performed in this class. Students are expected to learn from not only classroom lectures but also hands-on physics laboratory experiments, which constitute a fundamental academic skill required for future studies in their specific fields.

●Prerequisites

It is preferable to take courses of Fundamentals of Physics, but is not required

●Course contents

1. Lectures and exercises on the basics of measurements and analyses
2. Experiments (An additional experiment may be added.)
   - Acceleration due to gravity
   - Equipotential lines
   - Motion of electrons in magnetic field
   - Wavelength of light measured with diffracting grating
   - Oscilloscope
   - Resonance of electrical circuit
   - Low temperature properties of materials

●Evaluation methods

Evaluation will be based on participation, weekly recitations, and reports. Students will have to submit a report at the end of each session unless otherwise instructed. Class attendance is a very important factor affecting the approval of the credit of this course because the physics laboratory experiments class lays emphasis on class attendance and laboratory work performance. Students who are absent more than two times or submit a Course Withdrawal Request will receive an “Absence” grade.

●Notice for students

Students taking this course MUST attend the first class of this course to get guidance and safety training.

Textbook	Information about the text book will be announced in the first class.
Reference Book	Students are strongly encouraged to watch the experiment instruction video at the URL, http://elearn.ilas.nagoya-u.ac.jp/lms/pex_e/ to learn operations and procedure of the experiment PRIOR TO each class of the experiment.