

2019 (Term I · III · V)
School Specific Course Syllabus
For International Programs
(School of Agricultural Sciences)

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科目名 Course Title	
数学演習1a(Mathematics Tutorial 1a)	
学科・専攻 Department/Program	受講年次 Grade
G30 All program	1st
授業形態 Class style	必修・選択の別 Compulsory or Elective
演習	* See "Remarks"
時間割コード Registration code	開講期・曜日・時限 Semester,Day & Period
0910825	Fall semester Tue : 4
単位数 Credit	科目区分 Course type
1	Basic Specialized Courses
担当教員 Instructor	RICHARD Serge charle(RICHARD Serge charle)
所属研究室 Laboratory	Graduate School of Mathematics
連絡先 Contact	richard@math.nagoya-u.ac.jp
居室 Room	Sci. Bldg A, 237

講義の目的とねらい Course purpose
The aim of this course is to deepen the understanding of calculus and to cultivate the ability to apply mathematical knowledge. The course is mainly intended for students taking Calculus I.
履修要件 Prerequisite
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Submit a Course Withdrawal Request Form when the student has no intention of finishing the course during the semester.
成績評価 Grading
Your final grade will be determined by homework (50%) and quizzes (50%).
不可 (F) と欠席の基準 Criteria for "Absent" &"Fail" grades
The grading scale will be: S: 90-100, A: 80-89, B: 70-79, C: 60-69, F: 0-59.
関連する科目 Related courses
Calculus I, registration code : 0064511.
教室 Class room

Check the Course Timetable.
Room 407 of Science Building A.

授業内容 Content

Exercises sheets will be provided each week before the tutorial, and will be available on the web site of the course.
Homework will be due every week during the tutorial. For more information:

<http://www.math.nagoya-u.ac.jp/~richard/fall2019.html>

教科書 Textbook

参考書 Recommended reading

連絡方法 Contact method

Email to : richard@math.nagoya-u.ac.jp

その他 Remarks

*See Course List and Graduation Requirements for your program for your enrollment year.

科目名 Course Title	
数学演習1b(Mathematics Tutorial Ib)	
学科・専攻 Department/Program	受講年次 Grade
G30 All program	1st
授業形態 Class style	必修・選択の別 Compulsory or Elective
演習	* See "Remarks"
時間割コード Registration code	開講期・曜日・時限 Semester,Day & Period
0910826	Fall semester Tue : 4
単位数 Credit	科目区分 Course type
1	Basic Specialized Courses
担当教員 Instructor	BACHMANN Henrik(BACHMANN Henrik)
所属研究室 Laboratory	Graduate School of Mathematics
連絡先 Contact	henrik.bachmann@math.nagoya-u.ac.jp
居室 Room	Math Bldg, 457

講義の目的とねらい Course purpose
The aim of this course is to provide essential mathematical knowledge necessary to further study mathematics and other sciences at university level. The course is intended for students taking Linear algebra I.
履修要件 Prerequisite
High-school level mathematics.
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Submit a Course Withdrawal Request Form when the student has no intention of finishing the course during the semester.
成績評価 Grading
Your final grade will be determined by homework and quizzes.
不可 (F) と欠席の基準 Criteria for "Absent" &"Fail" grades
The grading scale will be: S: 90-100, A: 80-89, B: 70-79, C: 60-69, F: 0-59.
関連する科目 Related courses
Linear algebra I
教室 Class room

Check the Course Timetable.
Science Building A, rooms 407 & 408.

授業内容	Content
Exercises sheets will be provided each week before the tutorial. Homework are due the following week. The topics are: Linear systems, Gaussian elimination, matrices, vectors, linear maps, matrix multiplication, the inverse of a linear map, subspaces of $\mathbb{R}^n$, image and kernel, linear independence, bases, dimension, coordinates, orthogonal bases, the Gram–Schmidt algorithm, QR factorization, orthogonal complement, orthogonal maps, least square approximations.	
教科書	Textbook
Otto Bretscher: Linear Algebra with Applications, fourth edition, Pearson 2009. ISBN: 978-0-13-600926-9	
参考書	Recommended reading
連絡方法	Contact method
その他	Remarks
*See Course List and Graduation Requirements for your program for your enrollment year. Updated informations will be available on https://www.henrikbachmann.com/tutorial1b.html	

科目名 Course Title	
物理学基礎演習1a(Fundamental Physics Tutorial 1a)	
学科・専攻 Department/Program	受講年次 Grade
G30 Physics	1st
授業形態 Class style	必修・選択の別 Compulsory or Elective
演習	* See "Remarks"
時間割コード Registration code	開講期・曜日・時限 Semester,Day & Period
0910822	Fall semester Fri : 3
単位数 Credit	科目区分 Course type
1	Basic Specialized Courses
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
This is the companion course to the lecture course Fundamentals of Physics I on introductory calculus-based mechanics. It offers exercises to cultivate the ability to analyze and solve problems, as well as presentation and discussion skills so as to participate effectively in discussions among peers and instructors, leading to mastering the concepts introduced in the lecture course. Therefore students taking the lecture course are expected to register for this tutorial course.
履修要件 Prerequisite
No prerequisite is required; however, students without a good background in high school physics and basic calculus must be prepared to spend more time on this course, and are advised to take this into consideration when deciding their course load.
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Students must follow the standard procedure for course withdrawal
成績評価 Grading
Attendance, class participation, quizzes and assignments. Details will be explained at the first tutorial.
不可（F）と欠席の基準 Criteria for "Absent" & "Fail" grades
Class attendance is required. Absentee must give a valid reason supported by documents. A student will receive an "Absent" grade if he is absent for more than 2 times without valid reason.
関連する科目 Related courses

Fundamentals of Physics I; Calculus I	
教室	Class room
Check the Course Timetable. See announcement	

授業内容	Content
See syllabus for Fundamentals of Physics I.	

教科書	Textbook
Students are required to purchase the online Fundamentals of Physics Extended 10th Edition International Student Version with WileyPLUS Set (John Wiley & Sons, 2010 ISBN:9780470576083) [However, do not purchase it before the first class meeting where further details will be announced in class]	
参考書	Recommended reading
連絡方法	Contact method
By appointment. Please email instructors to make an appointment.	
その他	Remarks
*See Course List and Graduation Requirements for your program for your enrollment year. • Concurrent registration for Fundamentals of Physics I is required. • Students are expected to participate actively in class activities throughout the course.	

科目名 Course Title	
物理学基礎演習1b(Fundamental Physics Tutorial 1b)	
学科・専攻 Department/Program	受講年次 Grade
G30 Physics	1st
授業形態 Class style	必修・選択の別 Compulsory or Elective
演習	* See "Remarks"
時間割コード Registration code	開講期・曜日・時限 Semester,Day & Period
0910823	Fall semester Fri : 3
単位数 Credit	科目区分 Course type
1	Basuc Specialized Courses
担当教員 Instructor	TAMA Florence Muriel(TAMA Florence Muriel)
所属研究室 Laboratory	
連絡先 Contact	
居室 Room	

講義の目的とねらい Course purpose
This is a companion course to Fundamental Physics II, and offers practical exercises for mastering the concepts introduced in the lecture courses. Students taking the lecture courses should also take this tutorial class
履修要件 Prerequisite
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Students need to submit a Course Withdrawal Request Form if they have no intention of finishing a course during the semester.
成績評価 Grading
Weekly tutorials, quizzes (Weighting to be advised)
不可 (F) と欠席の基準 Criteria for "Absent" &"Fail" grades
Class attendance is required. Absentees must give a valid reason (e.g. doctor ' s certificate). A student who is absent from more than 3 sessions will receive zero for the semester attendance mark. The “ Absent ” grade is reserved for students who withdraw until just after the final quiz. After that day, a letter grade will be awarded based on marks earned from all assessment during the semester.
関連する科目 Related courses
Calculus I, Calculus II, Linear Algebra I, Linear Algebra II, Fundamentals of Physics I, III & IV

教室	Class room
Check the Course Timetable. Check the Course Timetable	
授業内容	Content
See syllabus for Fundamental Physics II.	
教科書	Textbook
Fundamentals of Physics Extended 10th Edition International Student Version with WileyPLUS Set (John Wiley & Sons, 2010 ISBN: 9781118230749)	
参考書	Recommended reading
連絡方法	Contact method
By email: florence.tama@nagoya-u.jp	
その他	Remarks
*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. - No pre-requisite is required; however, students without a good background in high school physics and basic calculus are expected to spend more time on this course, and are advised to take this into consideration when deciding their course load. - Concurrent registration for Fundamental Physics II is required. - Students are expected to participate actively in class activities throughout the course.	

科目名 Course Title	
生化学1(Biochemistry I)	
学科・専攻 Department/Program	受講年次 Grade
G30 Biology	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	開講期・曜日・時限 Semester,Day & Period
0910805	Fall semester Mon : 1
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	YOU Young-Jai(YOU Young-Jai)
所属研究室 Laboratory	Genetics and Metabolic Regulation of Behavior
連絡先 Contact	yjyou@bio.nagoya-u.ac.jp
居室 Room	SS508

講義の目的とねらい Course purpose
The purpose of this course is to introduce the biomolecules and their contributions to life.
履修要件 Prerequisite
N/A
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Submit the Course Withdrawal Request form by the sixth lecture
成績評価 Grading
Evaluation will be based on in-class participation, quizzes, assignments and examinations.
不可（F）と欠席の基準 Criteria for "Absent" &"Fail" grades
Absent based on submission of Course Withdrawal Request Form. Fail based on “Failed” results of examinations and assignments.
関連する科目 Related courses
Biochemistry II, III, and IV (Terms IV, V, and VI, respectively)
教室 Class room

Check the Course Timetable.
 Check the Course Timetable.
 A407 (Science building A, room 407)

授業内容	Content
	1. Introduction 2. Thermodynamics 3. Water: Physical & chemical properties of water. 4. Amino Acids 5. Proteins: 2D structures 6. Proteins: 3D structures 7. Proteins in action: Hemoglobin 8. Tools to study protein functions 9. Proteins in action: enzymes 10. DNA, RNA and genome 11. Tools to study genomes

教科書	Textbook
	1. Principles of Biochemistry by Voet, D., Voet, J.G. and Pratt, C.W., Wiley and son, Inc. USA. ISBN: 78-11809244-6, 4th edition 2. Biochemistry by Berg, Tymoczko, Stryer, 8th edition. 3. Lehninger Principles of Biochemistry by Nelson and Cox, 7th edition.
参考書	Recommended reading
	Recommended reading will be suggested in the class.
連絡方法	Contact method
	via email
その他	Remarks
	*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.

科目名 Course Title	
生理・解剖学1(Physiology and Anatomy I)	
学科・専攻 Department/Program	受講年次 Grade
G30 Biology	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	開講期・曜日・時限 Semester,Day & Period
0913021	Fall semester Mon : 2
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	VASSILEVA Maria(VASSILEVA Maria)
所属研究室 Laboratory	E202
連絡先 Contact	mnvassileva@bio.nagoya-u.ac.jp
居室 Room	E202

講義の目的とねらい Course purpose
This course is designed to deepen students` knowledge in human physiology and anatomy. The course focuses on understanding the normal function of organs and organ systems, as well as how those functions change in disease. Students will familiarize themselves with the appropriate scientific terminology and advanced physiology concepts.
履修要件 Prerequisite
Strongly recommended to have completed Fundamentals of Biology II
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Need to submit a Course Withdrawal Request Form when students have no intention of finishing a course during the semester. Submit Course Withdrawal Request form by the sixth lecture. For later course withdrawal contact the lecturer.
成績評価 Grading
Evaluation will be based on in-class participation, assignments and examinations.
不可（F）と欠席の基準 Criteria for "Absent" &"Fail" grades
Absent: based on submission of Course Withdrawal Request Form. Fail: Total accumulated score of less than 60%.
関連する科目 Related courses
Fundamentals of Biology 2

教室	Class room
Check the Course Timetable. A 408	
授業内容	Content
Detailed content: 1. Respiratory system 2. Cardiovascular system 3. Renal system 4. Gastrointestinal system 5. Endocrine system 6. Reproductive system	
教科書	Textbook
Anatomy and Physiology by OpenStax College, free downloadable textbook (https://openstaxcollege.org/textbooks/anatomy-and-physiology)	
参考書	Recommended reading
1. Berne & Levy Principles of Physiology, Levy, Koeppen and Stanton; Mosby. 2. Human Physiology, The basis of medicine, Pocock and Richards; Oxford University Press. 3. Physiology, 3rd ed., Constanzo; Elsevier. 4. Netter`s Essential Physiology, Mulroney and Myers; Saunders.	
連絡方法	Contact method
By e-mail	
その他	Remarks
*See Course List and Graduation Requirements for your program for your enrollment year.	

科目名 Course Title	
細胞学2(Cell Biology II)	
学科・専攻 Department/Program	受講年次 Grade
G30 Biology	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	開講期・曜日・時限 Semester,Day & Period
0910829	Fall semester Mon : 3
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	VASSILEVA Maria(VASSILEVA Maria)
所属研究室 Laboratory	E202
連絡先 Contact	mnvassileva@bio.nagoya-u.ac.jp
居室 Room	E202

講義の目的とねらい Course purpose
This course continues the Cell Biology series of courses with purpose to deepen students' knowledge in basic cell organization and functions. Cell Biology II focuses on membranes and intracellular transport, and how cells communicate and respond to the environment. Furthermore, it will provide details on the essential concepts of how plant and animal cells generate energy.
履修要件 Prerequisite
Strongly recommended to have completed Fundamentals of Biology 1.
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Need to submit a Course Withdrawal Request Form when students have no intention of finishing a course during the semester. Submit Course Withdrawal Request form by the sixth lecture. For later course withdrawal contact the lecturer.
成績評価 Grading
Evaluation is based on in-class participation, assignments and examinations.
不可（F）と欠席の基準 Criteria for "Absent" & "Fail" grades
Absent: based on submission of Course Withdrawal Request Form. Fail: Total accumulated score of less than 60%.
関連する科目 Related courses

Cell Biology I, Cell Biology III
教室 Class room
Check the Course Timetable. A 408

授業内容 Content
The big theme of the course is membranes. Detailed content: 1. Membrane structure and function 2. Intracellular Compartments and Transport; 3. Cell Communication; 4. How cells obtain energy from food 5. Energy Generation in Mitochondria and Chloroplasts.

教科書 Textbook
Essential Cell Biology, B. Alberts et al., Garland Science.
参考書 Recommended reading
Becker`s world of the cell, Hardin, Bertoni, Kleinsmith, Pearson. Molecular Biology of the Cell, B. Alberts et al., Taylor & Francis.
連絡方法 Contact method
By e-mail
その他 Remarks
*See Course List and Graduation Requirements for your program for your enrollment year.

科目名 Course Title	
分析化学(Analytical Chemistry)	
学科・専攻 Department/Program	受講年次 Grade
G30 Chemistry	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	開講期・曜日・時限 Semester, Day & Period
0910806	Fall semester Tue : 1
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	SAMJESKE Gabor arwed(SAMJESKE Gabor arwed)
所属研究室 Laboratory	
連絡先 Contact	gsamjeske@chem.nagoya-u.ac.jp
居室 Room	B-219

講義の目的とねらい Course purpose
The course will introduce the fundamentals of analytical chemistry and mainly focuses on classical but still widely used wet chemical methods, combined with an overview of the instrumental techniques used in contemporary chemical analysis.
履修要件 Prerequisite
Fundamentals in Chemistry I, II. Laboratory in Chemistry is mandatory!
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Course withdrawal will be allowed only until the first exam (intermediate exam), which will take place after lecture 6. Exceptions for later withdrawal can only be granted in cases of illness, injury or other unavoidable reasons.
成績評価 Grading
Activity (homework, quizzes, attendance): 10% Intermediate and final exam: 90% (40% intermediate, 50% final exam, comprehensive) TOTAL 100% = 100 pts Grades: "S" = 100 - 90% (> 90 pts), "A" = 89 - 80% (9 - 80 pts), "B" = 79 - 70% (79 - 70 pts), "C" = 69 - 60% (69 - 60 pts), "F" = 59 - 0% (< 60 pts) Grades are final and calculated on the basis of the performances during class and in the two exams only. There will be no possibility to improve a grade after the final exam. Students who miss the final exam due to a (documented) illness, injury or other unavoidable reasons can ask the instructor.
不可 (F) と欠席の基準 Criteria for "Absent" & "Fail" grades

The course will be graded "F" (failed) if less than 60% of the points were obtained. The course will be graded as "absent" as stated in "course withdrawal"	
関連する科目	Related courses
Inorganic Chemistry I + II, Chemistry of Inorganic Materials I, Laboratory in Chemistry	
教室	Class room
Check the Course Timetable. A-407	

授業内容	Content
Analytical Chemistry will cover the following topics • Acid - base equilibria • Precipitation/gravimetry • Redox equilibria • Titration • Spectrochemical methods • Chromatography	

教科書	Textbook
Gary D. Christian; " ANALYTICAL CHEMISTRY, 7TH EDITION"; 2013; Publication Hoboken, N.J.: John Wiley & Sons	
参考書	Recommended reading
連絡方法	Contact method
Either after the classes or during the office hours/by email (to be announced)	
その他	Remarks
*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.	

科目名 Course Title	
数理物理学演習1(Mathematical Physics Tutorial I)	
学科・専攻 Department/Program	受講年次 Grade
G30 Physics	2nd
授業形態 Class style	必修・選択の別 Compulsory or Elective
演習	* See "Remarks"
時間割コード Registration code	開講期・曜日・時限 Semester,Day & Period
0910824	Fall semester Tue : 4
単位数 Credit	科目区分 Course type
1	Basic Specialized Courses
担当教員 Instructor	阿部 智広(ABE Tomohiro)
所属研究室 Laboratory	KMI
連絡先 Contact	abetomo@kmi.nagoya-u.ac.jp
居室 Room	ES617

講義の目的とねらい Course purpose
Students taking Mathematical Physics I should also take this tutorial class. This course introduces first order and second order ordinary differential equations and their solution methods. Students master exact and approximate analytical techniques for initial value problems that arise in physics, engineering and chemistry. Questions of existence, uniqueness and convergence are also discussed. Fourier series follow naturally from the 2nd order theory and these are investigated, too.
履修要件 Prerequisite
Calculus I, Calculus II, Linear Algebra I, Linear Algebra II;or Consent of Instructor
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Ask the instructor.
成績評価 Grading
tutorial Attendance: 50%; Class performance: 50%
不可 (F) と欠席の基準 Criteria for "Absent" & "Fail" grades
The “ Absent ” grade is reserved for students who withdraw by November 14. After that day, a letter grade will be awarded based on marks earned from all assessments during the semester.
関連する科目 Related courses
Mathematical Physics Tutorial I, Mathematical Physics II

教室	Class room
Check the Course Timetable. ES033.	

授業内容	Content
• First order ordinary differential equation (ODE) initial value problems. Integration factor; separable equations; systems of ODEs (Hamiltonian systems); phase plane, flow. Uniqueness and existence theorems. Some differences between linear and nonlinear ODEs. • Second order linear ODE initial value problems. Homogeneous solution. Proving linear independence (Wronskian). Method of Undetermined Coefficients; Variation of Parameters. Series solutions: ordinary point, regular singular point; convergence tests; Method of Frobenius. Examples from physics, engineering and chemistry. • Fourier series. Dirichlet conditions. Role of symmetry. Gibbs phenomenon. Effect of jump discontinuity on speed of convergence. Integration and differentiation of Fourier series. • Fourier transform, convolution, Dirac delta function. Laplace transform.	

教科書	Textbook
None.	
参考書	Recommended reading
1. Boas M.L., 2006, Mathematical Methods in the Physical Sciences, 3rd ed., John Wiley & Sons. 2. Strang, G., Introduction to Linear Algebra, 4th Edition, Chapter 6. 3. Arfken G.B. & Weber H.J., 2005, Mathematical Methods for Physicists, 6th ed., Elsevier Academic Press. (Copies are available in the library.)	
連絡方法	Contact method
Office: ES Building, ES617 Phone: 052-789-6580 Email: abetomo@kmi.nagoya-u.ac.jp	
その他	Remarks
*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. Concurrent registration in Mathematical Physics I is advised.	

科目名 Course Title	
数理物理学1(Mathematical Physics I)	
学科・専攻 Department/Program	受講年次 Grade
G30 Physics	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	開講期・曜日・時限 Semester, Day & Period
0910810	Fall semester Tue : 5
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	WOJDYLO John Andrew(WOJDYLO John Andrew)
所属研究室 Laboratory	S-Lab
連絡先 Contact	john.wojdylo@s.phys.nagoya-u.ac.jp
居室 Room	ES033

講義の目的とねらい Course purpose
This course is a companion course to Mathematical Physics II. This course introduces first order and second order ordinary differential equations and their solution methods. Students master analytical techniques for problems that arise in physics, engineering and chemistry. Questions of uniqueness of solutions and convergence are also discussed. Students are also introduced to Fourier series, the Fourier transform, convolution, Laplace transform, and the Dirac delta function. Students will find this mathematical methods course helpful in other units such as Quantum Mechanics, Analytical Mechanics, Electricity and Magnetism, as well as in Automotive Engineering and other engineering courses. This course has dual aims: 1) to convey mathematical principles; 2) to improve students' technical ability – i.e. ability to express intuition in mathematical terms and ability to solve problems.
履修要件 Prerequisite
Calculus I; Calculus II; Linear Algebra I; Linear Algebra II, or Consent of Instructor
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Withdraw by November 15.
成績評価 Grading
Attendance: 5%; Weekly Quizzes and Assignments: 25%; Mid-term exam: 35%; Final Exam: 35%
不可 (F) と欠席の基準 Criteria for "Absent" & "Fail" grades
The “ Absent ” grade is reserved for students who withdraw by November 15. After that day, a letter grade will be awarded based on marks earned from all assessment during the semester.

関連する科目	Related courses
Mathematical Physics Tutorial I, Mathematical Physics II	
教室	Class room
Check the Course Timetable.	

授業内容	Content
• First order ordinary differential equation (ODE) initial value problems. Integration factor; separable equations; systems of ODEs (Hamiltonian systems); phase plane, flow. Uniqueness and existence theorems. Some differences between linear and nonlinear ODEs. • Second order linear ODE initial value problems. Homogeneous solution. Proving linear independence (Wronskian). Method of Undetermined Coefficients; Variation of Parameters. Series solutions: ordinary point, regular singular point; convergence tests; Method of Frobenius. Examples from physics, engineering and chemistry. • Fourier series. Dirichlet conditions. Role of symmetry. Gibbs phenomenon. Effect of jump discontinuity on speed of convergence. Integration and differentiation of Fourier series. • Fourier transform, convolution, Dirac delta function. Laplace transform.	

教科書	Textbook
Boyce W., DiPrima R, Elementary Differential Equations, 7th –10th Ed., Wiley.	
参考書	Recommended reading
1. Boas M.L., 2006, Mathematical Methods in the Physical Sciences, 3rd ed., John Wiley & Sons. 2. Strang, G., Introduction to Linear Algebra, 4th Edition, Chapter 6. 3. Arfken G.B. & Weber H.J., 2005, Mathematical Methods for Physicists, 6th ed., Elsevier Academic Press. (Copies are available in the library.)	
連絡方法	Contact method
その他	Remarks
*See Course List and Graduation Requirements for your program for your enrollment year. • Students taking Mathematical Physics I should also take Mathematical Physics Tutorial I. • Concurrent registration in Mathematical Physics II is recommended as that unit is a prerequisite for Electricity and Magnetism I. • The book by Boas is also useful for Mathematical Physics II, Electricity and Magnetism, as well as many other areas of physics.	

科目名 Course Title	
有機化学1(Organic Chemistry I)	
学科・専攻 Department/Program	受講年次 Grade
G30 Chemistry	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	開講期・曜日・時限 Semester, Day & Period
0910807	Fall semester Wed : 1
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	SHIN Jiyoung(SHIN Jiyoung)
所属研究室 Laboratory	E1#832
連絡先 Contact	jyshin@apchem.nagoya-u.ac.jp
居室 Room	E2#476

講義の目的とねらい Course purpose
The main purpose of this course is to acquire a logical framework for understanding fundamental organic chemistry. This framework emphasizes how the structures of organic molecules, as well as the electron density configurations, are related to patterns of chemical reactions. On the basis of the knowledge, how to solve practical problems is learned sequentially.
履修要件 Prerequisite
Fundamentals chemistry I and II
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Ask the course instructor.
成績評価 Grading
Examination [total 70%: two midterms(20% for each) and one final (30%)], Attendance (10%), and Assignment of Homework (20%): S($x \geq 90$), A($90 > x \geq 80$), B($80 > x \geq 70$), C($70 > x \geq 60$), and F($60 > x$).
不可 (F) と欠席の基準 Criteria for "Absent" & "Fail" grades
In the cases of any unavoidable reasons such as sickness, accident, or no attendance school, the student may get a grade of 'Absent' through the judgment of the course instructor and the student, when the student submits a 'Course Withdrawal Request Form' to receive the 'Absent' grade. Furthermore, no submission of sickness/absence reports and lack of attendance score will result in 'F' grade. It is for the protection of other attendances in the corresponding course from the frequent absences of the specific/uncertain student(s).
関連する科目 Related courses

Organic Chemistries II-V.
教室 Class room
Check the Course Timetable. E141

授業内容 Content
1. Structure and Bonding in Organic Molecules: Hybridization 2. Structures of Organic Molecules and Their Stereochemistry - Alkanes and Cycloalkanes - Alkenes and Alkynes - Delocalized π-System 3. Structures and Reactivity - Polar and Nonpolar Molecules - Formal Charge and Oxidation States - Acids and Bases versus Electrophiles and Nucleophiles - Chemical Reactions: Additions, Substitutions, and Eliminations - Chemical Kinetics: Transition State, Intermediate, Endothermic and Exothermic Processes, and Activation Energy 4. Aliphatic Nucleophilic Substitutions: SN1 and SN2 - Chemical Kinetics: Stabilities of Reaction Intermediates (Carbocations: Hyperconjugation and Resonances) - Stereochemistry upon the Stable Reaction Intermediate - Unimolecular Nucleophilic Substitutions (SN1): Favor Substrates, Nucleophiles, Leaving Groups, and Solvents - Bimolecular Nucleophilic Substitutions (SN2); Favor Substrates, Nucleophiles, Leaving Groups, and Solvents - Comparison of SN1 and SN2 - Competing Reactions of SN1: Rearrangement and Unimolecular Elimination (E1) - Competing Reaction of SN2: Bimolecular Elimination (E2) - Unimolecular Elimination of Conjugate Bases (E1CB) and SN2 - Chemical Kinetics: Stabilities of Reaction Intermediates (Carbocations: Hyperconjugation and Resonances) - Stereochemistry upon the Stable Reaction Intermediate - Unimolecular Nucleophilic Substitutions (SN1): Favor Substrates, Nucleophiles, Leaving Groups, and Solvents - Bimolecular Nucleophilic Substitutions (SN2); Favor Substrates, Nucleophiles, Leaving Groups, and Solvents - Comparison of SN1 and SN2 - Competing Reactions of SN1: Rearrangement and Unimolecular Elimination (E1) - Competing Reaction of SN2: Bimolecular Elimination (E2) - Unimolecular Elimination of Conjugate Bases (E1CB)

教科書 Textbook
Organic Chemistry: Structure and Function (Seventh Edition), Peter C. Vollhardt and Neil E. Schore, (W. H. Freeman and Company), New York, 2014, Chapters 1-7.
参考書 Recommended reading
連絡方法 Contact method
Students can communicate with the course instructor face-to-face either in the class or through the appointment. Contact by an e-mail is also available.
その他 Remarks
*See Course List and Graduation Requirements for your program for your enrollment year.

科目名 Course Title	
解析力学1(Analytical Mechanics I)	
学科・専攻 Department/Program	受講年次 Grade
G30 Physics	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	開講期・曜日・時限 Semester,Day & Period
0910808	Fall semester Wed : 2
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
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
This is the first of two courses in analytical mechanics. Analytical mechanics abstracts from Newtonian mechanics and generalizes it to a beautiful and 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.
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
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Unnecessary <条件等 Conditions> You may withdraw from the course following the standard procedure of the School of Science.
成績評価 Grading
Will be based on attendance, homework and exams (The details will be announced in class)
不可 (F) と欠席の基準 Criteria for "Absent" & "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
Check the Course Timetable. Check the course timetable.	
授業内容	Content
1. Survey of elementary principles 2. Variational principles and Lagrangian mechanics 3. Symmetries and conservation laws 4. Hamiltonian mechanics 5. Central force problem	
教科書	Textbook
H. Goldstein, C. Poole and J. Safko, "Classical Mechanics", Pearson; 3rd edition (2013), ISBN-10: 1292026553, ISBN-13: 978-1292026558	
参考書	Recommended reading
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. L. N. Hand and J. D. Finch, "Analytical Mechanics", Cambridge University Press (1999), ISBN-10: 0521575729, ISBN-13: 978-0521575720.	
連絡方法	Contact method
その他	Remarks
*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.	

G30 Program (School of Agricultural Sciences), (Undergraduate)

Agricultural Science			
Registration code	0913001	Credits	2.0
Course Category	Specialized Courses	Class room	Room 6
Term (Semester)/Day/Period	III (2 nd year 1 st semester)/Wed/5(16:30-18:00)		
Instructor	INOUE Naoko (Lectures are also given by other professors.)		
Contact	Office: Graduate School of Bioagricultural Sciences, Rm A242 Phone: 052-789-4074 E-mail: ninoue@agr.nagoya-u.ac.jp		
Course Purpose We are beset by an array of global concerns such as the depletion of food and energy resources, poverty and health problems, and the destruction of the natural- and living-environments. This course, by taking as its base recent developments in the field of life sciences, aims to propose possible solutions to the above, through the analysis of biological production, symbiosis, and frontier technology in the field of bioscience.			
Course Contents 1. Introduction (INOUE Naoko) 2. Ecology of irrigated rice fields (MURASE Jun) 3. International cooperation for agricultural development (ITO Kasumi) 4. Basic reproductive endocrinology (TSUKAMURA Hiroko) 5. Insecticides and pest management (MINAKUCHI Chieka) 6. Genetically modified crops 1 (TANIGUCHI Mitsutaka) 7. Genetically modified crops 2 (Joyce Abad CARTAGENA) 8. Enzyme engineering (IWASAKI Yugo) 9. Current trend in crop production in Japan (YAMAUCHI Akira) 10. Biomass chemistry (AOKI Dan) 11. Nutrition and food sciences (KITAURA Yasuyuki) 12. Interaction between plants and climate (KOTANI Ayumi) 13. Group discussion 1 (INOUE Naoko) 14. Group discussion 2 (INOUE Naoko) 15. Remarks (INOUE Naoko)			
Grading Evaluation will be based on in-class participation and assignments.			
Course Withdrawal TBA		Criteria for “Absent” & “Fail” Grades TBA	
Prerequisite		Related Courses	
Text Book			
Reference Book	TBA		
Remarks	Japanese undergraduates and short-visit international students may also take the lecture.		

科目名	Course Title
物理化学1(Physical Chemistry I)	
学科・専攻	Department/Program
G30 Chemistry	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
0910809	Fall semester Thu : 1
単位数	Credit
科目区分	Course type
2	Basic Specialized Courses
担当教員	Instructor
BUTKO Peter(BUTKO Peter)	
所属研究室	Laboratory
連絡先	Contact
Phone: 789-2480 E-mail: pbutko@chem.nagoya-u.ac.jp	
居室	Room
B221 (Science Building B)	

講義の目的とねらい	Course purpose
The purpose of this course is to learn what physical chemistry is all about and to grasp important principles and facts about physical chemistry. The course begins with perfect gas law, proceeds to thermodynamics, and finishes with applications of thermodynamics to simple mixtures.	
履修要件	Prerequisite
Fundamentals of Chemistry I and II	
履修取り下げの方法について	How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Students that do not intend to finish the course must submit a Course Withdrawal Request Form with the Instructor's signature. The last day to withdraw without academic penalty is the 6th lecture period.	
成績評価	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).	
不可 (F) と欠席の基準	Criteria for "Absent" & "Fail" grades
The “ Absent ” grade is reserved for students that withdraw by the 6th lecture period. After that day, a letter grade will be awarded based on grades earned from all assignments during the semester.	
関連する科目	Related courses

教室	Class room
Check the Course Timetable. A-407	

授業内容	Content
1 The Properties of Gases 1 (Ch. 1) 2 The Properties of Gases 2 (Ch. 1) 3 The First Law 1 (Ch. 2) 4 The First Law 2 (Ch. 2) 5 Pre-exam Review & EXAM 1 (Chs. 1 & 2) 6 The Second and Third Laws 1 (Ch. 3) 7 The Second and Third Laws 2 (Ch. 3) 8 Physical Transformations of Pure Substances (Ch. 4) 9 Simple Mixtures 1 (Ch. 5) 10 Simple Mixtures 2 (Ch. 5) 11 Pre-exam Review & EXAM 2 (Chs. 3 – 5) 12 Chemical Equilibrium 1 (Ch. 6) 13 Chemical Equilibrium 2 (Ch. 6) 14 Pre-final Review 15 FINAL EXAM (Ch. 1 – 6)	

教科書	Textbook
P. Atkins and J. de Paula: Atkins ' Physical Chemistry, 11th Ed., Oxford University Press, 2018	
参考書	Recommended reading
連絡方法	Contact method
pbutko@chem.nagoya-u.ac.jp	
その他	Remarks
*See Course List and Graduation Requirements for your program for your enrollment year. 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.	

科目名 Course Title	
遺伝学1(Genetics I)	
学科・専攻 Department/Program	受講年次 Grade
G30 Biology	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	開講期・曜日・時限 Semester,Day & Period
0913003	Fall semester Thu : 2
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	VASSILEVA Maria(VASSILEVA Maria)
所属研究室 Laboratory	
連絡先 Contact	mnvassileva@bio.nagoya-u.ac.jp
居室 Room	E202

講義の目的とねらい Course purpose
This course will deepen basic knowledge of genetics, and is the beginning of a series of courses on Genetics. Students will learn the mechanisms of fundamental processes related to how genetic information can be inherited rigidly and flexibly from generation to generation. Students are expected to become confident at using appropriate scientific terminology, explain the basic genetics concepts and be able to analytically manipulate this information.
履修要件 Prerequisite
Strongly recommended to have completed Fundamentals of Biology 1
履修取り下げについて Course withdrawal
<可否> Possible <条件> Submit Course Withdrawal Request form by the sixth lecture to receive an Absent grade. For later course withdrawal contact the lecturer.
成績評価 Grading
Evaluation is based on in-class participation, assignments and examinations.
不可 (F) と欠席の基準 Criteria for "Absent" & "Fail" grades
Absent – based on submission of Course Withdrawal Request Form. Fail – based on a total accumulated score of less than 60%.
関連する科目 Related courses
Genetics II, Genetics III

教室	Class room
Check the Course Timetable. A 407	
授業内容	Content
Overall theme of the course - Maintenance of the genome Detailed content: 1. Mendelian genetics 2. DNA and RNA structure 3. Chromosomes, chromatin, and the nucleosome 4. Replication of DNA 5. Mutability and repair of DNA 6. Genetic recombination	
教科書	Textbook
Molecular Biology of the Gene, Watson, James D. et al., Pearson Education.	
参考書	Recommended reading
Essentials of Genetics, William S. Klug et al., Benjamin Cummings. Molecular Biology of the Cell, B. Alberts et al., Taylor and Francis.	
連絡方法	Contact method
by e-mail	
その他	Remarks
*See Course List and Graduation Requirements for your program for your enrollment year.	

科目名 Course Title	
統計物理学1(Statistical Physics I)	
学科・専攻 Department/Program	受講年次 Grade
G30 Physics	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	開講期・曜日・時限 Semester,Day & Period
0910812	Fall semester Fri : 2
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	HOSSAIN Akter(HOSSAIN Akter)
所属研究室 Laboratory	
連絡先 Contact	
居室 Room	

講義の目的とねらい Course purpose
The purpose of Statistical Physics I is to understand the basic laws that govern macroscopic bodies consisting of an enormous number of atoms and molecules. This first part of the course covers universal phenomenological laws, called thermodynamic laws, and their applications. The main focus of this course is to understand the basic principles of classical thermodynamics which are the basis for macroscopic understanding of all the physical phenomena. The applications in automotive engineering are also introduced.
履修要件 Prerequisite
Calculus
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Please confirm with the instructor for details.
成績評価 Grading
Grades will be based on class participation, assignments and a final examination. 30% for attendance 30% for assignments 40% for final examination
不可（F）と欠席の基準 Criteria for "Absent" & "Fail" grades
Please confirm with the instructor for details.

関連する科目	Related courses
教室	Class room
Check the Course Timetable.	

授業内容	Content
1.Thermal Equilibrium and Temperature 2.State Equations, Partial Differentials, Units and Dimensions 3.The First Law of Thermodynamics (energy, isothermal and adiabatic processes) 4.The Second Law of Thermodynamics 5.Entropy 6.Thermodynamic Functions 7.Phase Equilibrium and Chemical Equilibrium 8.Kinetic Theory and Statistical Mechanics	

教科書	Textbook
Printed handouts will be provided.	
参考書	Recommended reading
Modern Engineering Thermodynamics; Robert T. Balmer; Academic Press (2010)	
連絡方法	Contact method
Students can ask questions at any time during classes. Questions during off-class hours can be asked at the lecturer's room (Engineering Building No.3 North Wing, Room 223 (3125) or via e-mail: akter.hossain@mae.nagoya-u.ac.jp	
その他	Remarks
*See Course List and Graduation Requirements for your program for your enrollment year.	

科目名 Course Title	
細胞学1(Cell Biology I)	
学科・専攻 Department/Program	受講年次 Grade
G30 Biology	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	開講期・曜日・時限 Semester,Day & Period
0910811	Fall semester Fri : 3
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	VASSILEVA Maria(VASSILEVA Maria)
所属研究室 Laboratory	E202
連絡先 Contact	mnvassileva@bio.nagoya-u.ac.jp
居室 Room	E202

講義の目的とねらい Course purpose
This course is expected to deepen students' knowledge in basic cell organization, and is the beginning of series of courses on Cell Biology. Cell Biology I course provides students with an overview of cell structure, proteins structure and function, and fundamental genetic processes in the cell.
履修要件 Prerequisite
Strongly recommended to have completed Fundamentals of Biology I
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Need to submit a Course Withdrawal Request Form when students have no intention of finishing a course during the semester. Submit Course Withdrawal Request form by the sixth lecture. For later course withdrawal contact the lecturer.
成績評価 Grading
Evaluation is based on in-class participation, assignments and examinations.
不可（F）と欠席の基準 Criteria for "Absent" & "Fail" grades
Absent – based on submission of Course Withdrawal Request Form. Fail - a total accumulated score of less than 60%.
関連する科目 Related courses
Cell Biology II, Cell Biology III

教室	Class room
Check the Course Timetable. A 408	
授業内容	Content
The course introduces basic cell organization, the structure and role of proteins in cells, and then focuses on overview of genetic processes in the cell 1. Basic cell organization; 2. Protein structure and function; 3. Structure of DNA and chromosomes; 4. DNA replication, repair and recombination; 5. From DNA to protein 6. Control of gene expression 7. How genes and genomes evolve 8. Analyzing genes and genomes	
教科書	Textbook
Essential Cell Biology, B. Alberts et al., Garland Science.	
参考書	Recommended reading
Becker`s world of the cell, Hardin, Bertoni, Kleinsmith, Pearson. Molecular Biology of the Cell, B. Alberts et al., Taylor & Francis.	
連絡方法	Contact method
By e-mail	
その他	Remarks
*See Course List and Graduation Requirements for your program for your enrollment year.	

科目名 Course Title	
生理・解剖学2(Physiology and Anatomy II)	
学科・専攻 Department/Program	受講年次 Grade
G30 Biology	3rd
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	開講期・曜日・時限 Semester,Day & Period
0913022	Fall semester Tue : 2
単位数 Credit	科目区分 Course type
2	Specialized Courses
担当教員 Instructor	YOU Young-Jai(YOU Young-Jai)
所属研究室 Laboratory	Genetic and Metabolic Regulation of Behavior
連絡先 Contact	yjyou@bio.nagoya-u.ac.jp
居室 Room	SS508

講義の目的とねらい Course purpose
The purpose of this course is to provide the fundamentals of neuroscience required to understand how we sense, think and behave. We will cover the basic concepts of neuroscience and the structure and the function of the sensory and the motor systems.
履修要件 Prerequisite
Basic knowledge of biology is strongly recommended.
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Submit Course Withdrawal Request form by the sixth lecture.
成績評価 Grading
Evaluation will be based on in-class participation, assignments and examinations.
不可 (F) と欠席の基準 Criteria for "Absent" & "Fail" grades
Absent based on submission of Course Withdrawal Request Form. Fail based on “Failed” results of examinations and assignments.
関連する科目 Related courses
Physiology and Anatomy I
教室 Class room

Check the Course Timetable.
 Check the Course Timetable.
 Science Building A, Room A-408

授業内容	Content
	1. Introduction: structure and function of neurons and glia 2. Electrical signaling and ion channels 3. Synaptic transmission and synaptic plasticity 4. Motor system 4.1 Motor circuits: Lower Motor Neurons 4.2 Motor circuits: Upper Motor Neurons 4.3 Brain control of movement: Cerebellum and Basal ganglia 5. Sensory perception and integration 5.1 Somatosensory system 5.2 Visual system 5.3 Auditory and vestibular system 5.4 Chemical senses

教科書	Textbook
	Neuroscience, Dale Purves et al., Sinauer, 6 ed.
参考書	Recommended reading
	Recommended reading will be suggested during the classes.
連絡方法	Contact method
	via e-mail
その他	Remarks
	*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.

科目名 Course Title	
化学物理学(Cheical Physics)	
学科・専攻 Department/Program	受講年次 Grade
G30 Physics	3rd
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	開講期・曜日・時限 Semester,Day & Period
0913071	Fall semester Wed : 1
単位数 Credit	科目区分 Course type
2	Specialized Courses
担当教員 Instructor	岡本 祐幸(OKAMOTO Yuko)
所属研究室 Laboratory	Theoretical Biophysics
連絡先 Contact	okamoto@tb.phys.nagoya-u.ac.jp
居室 Room	510 Science Hall

講義の目的とねらい Course purpose
The purpose of this course is to learn about the statistical thermodynamics which can describe the behaviors of molecules in physical, chemical, and biological systems.
履修要件 Prerequisite
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Unnecessary <条件等 Conditions>
成績評価 Grading
Attendance: 10 %, Homework Sets: 20 %, Exams: 70 %
不可 (F) と欠席の基準 Criteria for "Absent" &"Fail" grades
The “ Absent ” grade is reserved for students who withdraw by the day that is specified by the University. After that day, a letter grade will be awarded based on marks earned from all assessment during the semester.
関連する科目 Related courses
Biophysics, Statistical Physics I
教室 Class room
Check the Course Timetable. ES034

授業内容	Content
	1. Mathematical Tools 2. Extremum Principles 3. Heat, Work, and Energy 4. Entropy and the Boltzmann Law 5. Thermodynamic Driving Forces 6. The Logic of Thermodynamics 7. Laboratory Conditions and Free Energy 8. Maxwell's Relations and Mixtures 9. The Boltzmann Distribution Law 10. The Statistical Mechanics of Simple Gases and Solids 11. Temperature and Heat Capacity 12. Chemical Equilibria

教科書	Textbook
	K.A. Dill and S. Bromberg, "Molecular Driving Forces" 2nd ed. (Garland Science).
参考書	Recommended reading
	F. Reif, "Fundamentals of Statistical and Thermal Physics" (McGraw-Hill).
連絡方法	Contact method
	By e-mail.
その他	Remarks
	*See Course List and Graduation Requirements for your program for your enrollment year.

科目名 Course Title	
遺伝学3(Genetics III)	
学科・専攻 Department/Program	受講年次 Grade
G30 Biology	3rd
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	開講期・曜日・時限 Semester,Day & Period
0913009	Fall semester Wed : 2
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	杉山 伸(SUGIYAMA Shin)
所属研究室 Laboratory	DG
連絡先 Contact	5039
居室 Room	E207
担当教員 Instructor	金森 章(KANAMORI Akira)
所属研究室 Laboratory	DG
連絡先 Contact	2537
居室 Room	E207
担当教員 Instructor	八木 克将(YAGI Yoshimasa)
所属研究室 Laboratory	DG
連絡先 Contact	5039
居室 Room	E207
担当教員 Instructor	五島 剛太(GOSHIMA Gota)
所属研究室 Laboratory	Z3
連絡先 Contact	6175
居室 Room	

講義の目的とねらい Course purpose
This course introduces the principles of molecular genetics.
履修要件 Prerequisite
A basic knowledge of molecular genetics

履修取り下げの方法について How to Apply for Course Withdrawal	
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Submit Course Withdrawal Request form by the sixth lecture.	
成績評価 Grading	
Each instructor will be responsible for 100 points for a course-total of 400 points. Evaluation will be based on in-class participation (0-30%) and assignments or examinations (70-100%), with percentage depending on the individual instructor. Grading scale: S=90-100%; A=80-89%; B=70-79%; C=60-69%; F=below 59%, of 400 point total. Formal requests for special considerations concerning health problems etc. should be submitted with documentation through the student's Student Advisor as early as possible.	
不可（F）と欠席の基準 Criteria for "Absent" & "Fail" grades	
Absent – based on submission of Course Withdrawal Request Form. Fail – based on “Failed” results of examinations and assignments.	
関連する科目 Related courses	
Genetics I, Genetics II	
教室 Class room	
Check the Course Timetable. Science Building A, Room A-408	

授業内容 Content	
Topics covered: Regulation of gene expression, genomics, systems biology, and methodology. Lectures based on "Molecular Biology of the Gene", by James D. Watson et al. will be given by 4 faculty members of the Division of Biological Science (Chapter numbers are according to the 6th (7th) edition). Chapter 16 (18) "Transcriptional Regulation in Prokaryotes" by Akira Kanamori Chapter 17 (19) "Transcriptional Regulation in Eukaryotes" by Akira Kanamori and Shin Sugiyama Chapter 18 (20) "Regulatory RNA" by Shin Sugiyama Chapter 19 (21) "Gene Regulation in Development and Evolution" by Yoshimasa Yagi Chapter 20 (22) "Genome Analysis and Systems Biology" by Yoshimasa Yagi and Gohta Goshima Chapter 21 (7) "Techniques of Molecular Biology" by Gohta Goshima Chapter 22 (Appx.1) "Model Organisms" by Gohta Goshima	

教科書 Textbook	
Molecular Biology of the Gene, James D. Watson et al. CSH Press/Pearson (6th edition or newer) ISBN 978-0805395921 (6th ed.), 978-0321762436 (7th ed.)	
参考書 Recommended reading	
連絡方法 Contact method	

その他	Remarks
	*See Course List and Graduation Requirements for your program for your enrollment year.

科目名 Course Title	
計算化学(Computational Chemistry)	
学科・専攻 Department/Program	受講年次 Grade
G30 Chemistry	3rd
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	開講期・曜日・時限 Semester,Day & Period
0913072	Fall semester Thu : 1
単位数 Credit	科目区分 Course type
2	Specialized Courses
担当教員 Instructor	柳井 毅(YANAI Takeshi)
所属研究室 Laboratory	ITbM
連絡先 Contact	yanait@chem.nagoya-u.ac.jp
居室 Room	302

講義の目的とねらい Course purpose
Computers and computing technologies are becoming increasingly important as a tool to facilitate complex work and expand ones' abilities for carrying out chemical studies. In this class, attendees will learn basics of programming for effectively using computer and write programs in Python language for numerical analysis, chemical calculations, etc.
履修要件 Prerequisite
履修取り下げの方法について How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Unnecessary <条件等 Conditions>
成績評価 Grading
Attendance and report on programming
不可（F）と欠席の基準 Criteria for "Absent" &"Fail" grades
"Absent": if 10% of 90min class is absent in class room. "Fail": if final report is not handed in.
関連する科目 Related courses
quantum chemistry
教室 Class room

Check the Course Timetable.
 理学部A館2階A250室
 A250 (room 250, Building A, Science Building)

授業内容	Content
	1. Python programming Tutorial 2. Numpy Tutorial 3. Graph and plotting: Matplotlib 4. Quantum chemistry calculations 5. Potential energy curves 6. Geometry optimization 7. Plotting of molecular orbitals 8. Problem sets
教科書	Textbook
参考書	Recommended reading
	Python tutorial: https://docs.python.org/2/tutorial/ Numpy quick tutorial: https://docs.scipy.org/doc/numpy/user/quickstart.html Matplotlib quick tutorial: https://matplotlib.org/tutorials/introductory/pyplot.html Hartree-Fock theory: http://vergil.chemistry.gatech.edu/courses/chem6485/pdf/Hartree-Fock-Intro.pdf Scikit-learn tutorials: http://scikit-learn.org/stable/tutorial/index.html
連絡方法	Contact method
その他	Remarks
	*See Course List and Graduation Requirements for your program for your enrollment year.

科目名 Course Title	
細胞学3(Cell Biology III)	
学科・専攻 Department/Program	受講年次 Grade
G30 Biology	3rd
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	開講期・曜日・時限 Semester,Day & Period
0913010	Fall semester Thu : 2
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	杉山 伸(SUGIYAMA Shin)
所属研究室 Laboratory	DG
連絡先 Contact	5039
居室 Room	E207
担当教員 Instructor	高木 新(TAKAGI Shin)
所属研究室 Laboratory	DG
連絡先 Contact	2537
居室 Room	E207
担当教員 Instructor	木下 専(KINOSHITA Makoto)
所属研究室 Laboratory	Cell Regulation
連絡先 Contact	3653
居室 Room	SS323

講義の目的とねらい Course purpose
This course covers basic topics in cell biology. Students who successfully complete this course will understand fundamental biological phenomena at the molecular and cellular levels that include the cytoskeletal systems, mitosis and meiosis, and intercellular communications in multicellular organisms. They will develop insights into the complexities of cell structure and function, the underlying molecular events, the dynamic properties of living cells, and how these contribute to the generation and functioning of the whole organism.
履修要件 Prerequisite
履修取り下げの方法について How to Apply for Course Withdrawal

<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Submit Course Withdrawal Request form by the sixth lecture.	
成績評価	Grading
Each instructor will be responsible for 100 points of a course-total of 300 points. Evaluation will be based on in-class participation (0-30%) and assignments or examinations (70-100%), with percentage depending on the individual instructor. Grading scale: S=90-100%; A=80-89%; B=70-79%; C=60-69%; F=below 59%, of 300 point total. Formal requests for special considerations concerning health problems etc. should be submitted with documentation through the student's Student Advisor as early as possible.	
不可（F）と欠席の基準	Criteria for "Absent" & "Fail" grades
Absent – based on submission of Course Withdrawal Request Form. Fail – based on “ Failed ” results of examinations and assignments.	
関連する科目	Related courses
教室	Class room
Check the Course Timetable. A-408	

授業内容	Content
Chapter 17 Cytoskeleton (by Kinoshita), Chapter 18 The Cell Division Cycle, Chapter 19 Sex and Genetics + α (by Sugiyama), Chapter 20 Cellular Communities: Tissues, Stem Cells and Cancer + α (by Takagi), "From cell biology to physiology and pathology" (by Kinoshita), Exam	

教科書	Textbook
Essential Cell Biology (5th ed.) Bruce Alberts et al.	
参考書	Recommended reading
連絡方法	Contact method

Kinoshita
SS323
052-789-3653
kinoshita.makoto@c.mbox.nagoya-u.ac.jp

Sugiyama
E207
052-789-5039
ssugiya@bio.nagoya-u.ac.jp

Takagi
E207
052-789-2537
takagi@bio.nagoya-u.ac.jp

その他	Remarks
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*See Course List and Graduation Requirements for your program for your enrollment year.

科目名	Course Title
地球惑星科学(Earth and Planetary Sciences)	
学科・専攻	Department/Program
G30 All program	3rd
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
0910818	Fall semester Fri : 1
単位数	Credit
科目区分	Course type
2	Basic Specialized Courses
担当教員	Instructor
HUMBLET Marc Andre	HUMBLET Marc Andre
所属研究室	Laboratory
Department of Earth and Planetary Sciences, Geobiology Group	
連絡先	Contact
Phone: 052-789-3037 / E-mail: humblet.marc@f.mbox.nago ya-u.ac.jp	
居室	Room
Science building E, 516	

講義の目的とねらい	Course purpose
In this course students will learn about the characteristics of the planets and other components of our solar system (orbital parameters, atmospheric conditions, internal structure and composition, geomorphology, geological activity). We will use the knowledge of our own planet Earth as a reference to understand processes occurring elsewhere. During the past fifty years, various spacecrafts and exploration vehicles have been used to considerably expand our knowledge of the solar system and send back to Earth ever more detailed pictures of distant worlds. The course will review the different means of space exploration and use abundant data acquired by past and ongoing missions to illustrate the characteristics of the planets. A recurrent topic throughout the course will be the fascinating question of the existence of extraterrestrial life and its detection. We will also discuss the future of space exploration.	
履修要件	Prerequisite
履修取り下げの方法について	How to Apply for Course Withdrawal
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> A student who wishes to withdraw from the course needs to submit a Course Withdrawal Request Form by the end of November in order to receive an “ Absent ” grade. This deadline does not apply to students who drop the class part-way through for an exceptional reason (e.g. illness, accident).	
成績評価	Grading
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% Two quizzes: 20% (10% each) Two short reports: 20% (10% each) Oral presentation: 20% Written essay: 40%	

不可（F）と欠席の基準	Criteria for "Absent" & "Fail" grades
An "Absent" grade is given to students who have officially withdrawn from the class by the end of May and to students who have withdrawn from the class for an exceptional reason (e.g. illness, accident). A "Fail" grade is given to students who withdraw from the class without meeting the aforementioned criteria and to students who have a final grade of 0-59%.	
関連する科目	Related courses
教室	Class room
Check the Course Timetable.	

授業内容	Content
1. Introduction 2. The Solar System 3. Space Exploration 4. The Earth-Moon System 5. Mercury 6. Venus 7. Mars 8. The asteroid belt 9. Jupiter 10. Saturn 11. Uranus & Neptune 12. Trans-Neptunian Objects	

教科書	Textbook
参考書	Recommended reading
連絡方法	Contact method
その他	Remarks
*See Course List and Graduation Requirements for your program for your enrollment year.	

科目名 Course Title	
生化学3(Biochemistry III)	
学科・専攻 Department/Program	受講年次 Grade
G30 Biology	3rd
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	開講期・曜日・時限 Semester, Day & Period
0913011	Fall semester Fri : 2
単位数 Credit	科目区分 Course type
2	Basic Specialized Courses
担当教員 Instructor	小嶋 誠司(KOJIMA Seiji)
所属研究室 Laboratory	Biomembrane Functions
連絡先 Contact	ex.2993, z47616a@cc.nagoya-u.ac.jp
居室 Room	Building G, room 409
担当教員 Instructor	打田 直行(UCHIDA Naoyuki)
所属研究室 Laboratory	Plant Pattern Formation
連絡先 Contact	ex.2841, uchinao@itbm.nagoya-u.ac.jp
居室 Room	ITbM305
担当教員 Instructor	廣田 毅(HIROTA Tsuyoshi)
所属研究室 Laboratory	Molecular Chronobiology
連絡先 Contact	ex.6356, thirota@itbm.nagoya-u.ac.jp
居室 Room	ITbM305
担当教員 Instructor	中村 匡良(NAKAMURA Masayoshi)
所属研究室 Laboratory	Photobiology
連絡先 Contact	ex.2101, mnakamu@itbm.nagoya-u.ac.jp
居室 Room	ITBM305

講義の目的とねらい Course purpose
This course focused on the metabolisms of biomolecules (Part IV, METABOLISM in the textbook), including carbohydrates, lipids, amino acids/proteins, and nucleic acids. The students learn the concept of free energy, mechanism of ATP production, catabolism and anabolism of biomolecules.
履修要件 Prerequisite

Prerequisite: Biochemistry I and II Basic knowledge of biology and chemistry	
履修取り下げの方法について How to Apply for Course Withdrawal	
<「履修取り下げ届」提出の要・不要 Necessity/Unnecessity to submit "Course Withdrawal Request Form"> Necessary <条件等 Conditions> Submit Course Withdrawal Request form by the sixth lecture.	
成績評価 Grading	
Evaluation will be based on in-class participation, assignments and examinations. Presence will be marked. In-class participation will be considered an important element in overall grading.	
不可（F）と欠席の基準 Criteria for "Absent" & "Fail" grades	
Absent – based on submission of Course Withdrawal Request Form. Fail – based on “ Failed ” results of examinations and assignments.	
関連する科目 Related courses	
Cell Biology I and II, Biochemistry I and II	
教室 Class room	
Check the Course Timetable. A408	

授業内容 Content	
1. Bioenergetics 2. Glycolysis and the pentose phosphate pathway 3. Additional pathways in carbohydrate metabolism (Glycogen metabolism and gluconeogenesis) 4. The citric acid cycle 5. Mitochondrial ATP synthesis 6. Photosynthesis 7. Synthesis and degradation of lipids 8. Synthesis and degradation of amino acids 9. Regulation of fuel metabolism 10. Synthesis and degradation of nucleotides	

教科書 Textbook	
Principles of Biochemistry (2013), International Student Version (Fourth edition) by Donald Voet, Judith G. Voet, Charlotte W. Pratt (John Wiley & Sons)	
参考書 Recommended reading	
Molecular Biology of the Cell, by B. Alberts et al. (Taylor & Francis; 5th Revised Edition) Biochemistry, 3rd Edition, by Donald Voet, Judith G. Voet (John Wiley & Sons) Principles of Biochemistry, by A.L. Lehninger et al. (W.H.Freeman & Co.)	
連絡方法 Contact method	
E-mail (Seiji Kojima: z47616a@cc.nagoya-u.ac.jp) or phone (052-789-2993).	

その他	Remarks
	*See Course List and Graduation Requirements for your program for your enrollment year.