

Course Type	Basic Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Automotive Engineering
Starts 1	1 Autumn Semester
Lecturer	Tsuyoshi INOUE Professor

Course Purpose

Advanced lectures on the fundamental and applied subjects of the dynamical system. Particle system, rigid body system with constraints will be described. Moreover, the analytical techniques, concepts in the dynamical analysis for these systems will be described.

Prerequisite Subjects

Mathematics I,II with Exercises, Mechanics I,II with Exercise, Dynamical System Theory, Numerical Analysis

Course Topics

1. Dynamics of a particle and its basic analytical concept: Fixed point and its stability, \ 2. Dynamics of a particle and its advanced analytical concept: Analysis using first integral, \ 3. Cyclic coordinate and Routh's method\ 4. Map, fixed point and its stability\ 5. Dynamics of a rigid body (introduction of Euler angles and Euler parameters)

Textbook

Printed material will be distributed, or download page will be prepared.

Additional Reading

Analytical Dynamics, Haim Baruh; \ Applied Nonlinear Dynamics, A.H.Nayfeh

Grade Assessment

Evaluate based on the short report at each time and Reports(3-4 times) at the end of each part. Total score is 100, and credit will be awarded to those students who score 60 marks or more. Ranks are as follows: F(0-59), C(60-69), B(70-79), A(80-89) and S(90-100).

Notes

Contacting Faculty

Course Type	Basic Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Autumn Semester	1 Autumn Semester
Lecturer	HOSSAIN Akter Designated Lecturer	

Course Purpose

In this course, students will learn about the advanced direct injection gasoline and gas engines.

Course objectives include

- (1) developing an understanding of the design and mechanics of direct injection gasoline and gas engines and,
- (2) reviewing revolutionary enabling technologies for direct injection gasoline and gas engines.

Prerequisite Subjects

Thermodynamics, Fluid Mechanics

Course Topics

1. Overview of gasoline direct injection engines
2. Stratified-charge combustion in gasoline direct injection engines
3. Turbocharged direct injection spark-ignition engines
4. Lean boost combustion system for improved fuel economy
5. EGR boosted gasoline direct injection engines
6. Gasoline direct injection engines with autoignition combustion
7. Design and optimization of direct injection engines using CFD
8. Natural gas direct injection engines
9. Biofuels for spark-ignition engines

Textbook

Printed handouts will be provided.

Additional Reading

Advanced direct injection combustion engine technologies and development, Volume1: Gasoline and gas engines, Edited by Hua Zhao, Woodhead Publishing Ltd. 2010

Grade Assessment

Grades will be based on class participation and reports.

30% for attendance

30% for interim report

40% for final report

Notes

Contacting Faculty

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

Automotive Engineering Seminar 1A (2.0credits) (自動車工学セミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Autumn Semester	1 Autumn Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

The aim of this course is to help students acquire deep understanding of the fundamental science and engineering related to automobiles.

Prerequisite Subjects

All courses in undergraduate course.

Course Topics

This seminar deals with the basis of fundamental science and engineering related to automobiles.

Textbook

Will be introduced in the class.

Additional Reading

Grade Assessment

Grading will be decided based on attendance and the quality of the students' contribution to the seminar.

Notes

Contacting Faculty

Automotive Engineering Seminar 1B (2.0credits) (自動車工学セミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Spring Semester	1 Spring Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

The aim of this course is to help students acquire deep understanding of the fundamental science and engineering related to automobiles.

Prerequisite Subjects

All courses in undergraduate course.

Course Topics

This seminar deals with the basis of fundamental science and engineering related to automobiles.

Textbook

Will be introduced in the class.

Additional Reading

Grade Assessment

Grading will be decided based on attendance and the quality of the students' contribution to the seminar.

Notes

Contacting Faculty

Automotive Engineering Seminar 1C (2.0credits) (自動車工学セミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	2 Autumn Semester	2 Autumn Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

The aim of this course is to help students acquire deep understanding of the fundamental science and engineering related to automobiles.

Prerequisite Subjects

All courses in undergraduate course.

Course Topics

This seminar deals with the basis of fundamental science and engineering related to automobiles.

Textbook

Will be introduced in the class.

Additional Reading

Grade Assessment

Grading will be decided based on attendance and the quality of the students' contribution to the seminar.

Notes

Contacting Faculty

AutomotiveEngineering Seminar 1D (2.0credits) (自動車工学セミナー1D)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Automotive Engineering Automotive Engineering
Starts 1	2 Spring Semester 2 Spring Semester
Lecturer	Faculty of Automotive Engineering

Course Purpose

The aim of this course is to help students acquire deep understanding of the fundamental science and engineering related to automobiles.

Prerequisite Subjects

All courses in undergraduate course.

Course Topics

This seminar deals with the basis of fundamental science and engineering related to automobiles.

Textbook

Will be introduced in the class.

Additional Reading

Grade Assessment

Grading will be decided based on attendance and the quality of the students' contribution to the seminar.

Notes

Contacting Faculty

Advanced Thermal Engineering (2.0credits) (熱工学特論)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Mechanical Systems Engineering	Automotive Engineering
Starts 1	Spring Semester ,every other year	1 Autumn Semester
Lecturer	Hosei NAGANO Professor	

Course Purpose

Prerequisite Subjects

Course Topics

Textbook

Additional Reading

Grade Assessment

Notes

Contacting Faculty

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Mechanical Systems Engineering	Automotive Engineering
Starts 1	Spring Semester ,every other year	1 Spring Semester
Lecturer	ShogoOKAMOTO Associate Professor	

Course Purpose

Substantial difficulties of dynamic systems in the real world lie in the involvement of a large number of related factors that deviate statistically. Multivariate analyses and statistics are common tools for understanding and modeling these intricate systems. This course is arranged for those who had few opportunities to study statistics, multivariate analyses, and some basis for these mathematics. We learn intermediate topics of classic multivariate analyses and related statistics. We also practice how to apply each method of multivariate analysis on real data and interpret the results throughout the course.

Prerequisite Subjects

Mathematics, especially, linear algebra of undergraduate level.

Course Topics

- 1-3 h: Introduction. Multivariate regression analysis and related math.
- 4-6 h: Principal component analysis and related math.
- 7-9 h: Structure equation modeling (Covariance structure analysis)
- 10-12 h: Graphical modeling using partial correlation coefficients (Covariance selection)
- 13 h: Preparation for the final presentation
- 14 h: Final presentation

Textbook

Will be provided on site.

Additional Reading

1. Yutaka Tanaka, Tomoyuki Tarumi, Handbook of statistical analysis, Kyoritsu Shuppan, 1995. (In Japanese)
2. Shotaro Akaho, Kernel multivariate analysis, Iwanami Shoten, 2008. (In Japanese)

Grade Assessment

Three reports (60%) and one presentation (40%) are collectively evaluated. We will have chances of quiz reports 6 or 7 times in total, and at least 3 reports should be submitted. If you submit more than 4 reports, 3 best ranked reports will be considered for the final evaluation. Also, all students have to prepare for the final presentation, on which real world data is examined with one of the analysis methods.

Notes

Contacting Faculty

Any time by e-mails or direct visits.

Advanced Lectures on Strength and Fracture of Materials (2.0credits) (材料強度学特論)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Mechanical Systems Engineering	Automotive Engineering
Starts 1	Spring Semester ,every other year	Spring Semester ,every other year
Lecturer	Dai OKUMURA Professor	

Course Purpose

Prerequisite Subjects

Course Topics

Textbook

Additional Reading

Grade Assessment

Notes

Contacting Faculty

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Autumn Semester	1 Autumn Semester
Lecturer	Toshiro MATSUMOTO Professor	

Course Purpose

The purpose of this course is to acquire the fundamentals of the finite element method for solids. Through this course, students will develop an understanding of (1) the fundamentals of elastostatics and the principles used as the starting point of the finite element method, and (2) discretization of the integral form to obtain the numerical solutions and solution algorithms of the finite element method (students will also solve some simple practical examples using the given finite element code).

Prerequisite Subjects

Mathematics, Physics, Computer Software, Mechanics of Materials, Solid Mechanics

Course Topics

1. Stress, traction, strain
2. Equilibrium equation and Hooke's law
3. Virtual work principle and method of weighted residuals
4. Weak form
5. Discretization of weak form
6. Shape functions
7. Stiffness matrix
8. Numerical integration formulas
9. Solution algorithms

Textbook

Additional Reading

Introduction to Approximate Solution Techniques, Numerical Modeling, and Finite Element Methods, Marcel Dekker Inc

Grade Assessment

Grades will be based on class participations, reports.

Notes

Contacting Faculty

Students can ask questions at any time during classes.

Questions during off-class hours can be asked at the lecturers' rooms:

Room 323, Engineering Building No.2 North Wing 3F, (2780), E-mail: t.matsumoto@nuem.nagoya-u.ac.jp

Advanced Lectures on Communication and Image Processing (2.0credits) (通信・画像信号処理工学特論)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Automotive Engineering	Automotive Engineering	
Starts 1	1 Spring Semester	1 Spring Semester	
Lecturer	Masaaki KATAYAMA Professor Keita Takahashi Associate Professor	Takaya YAMAZATO Professor	"FUJII Toshiaki" Professor

Course Purpose

This lecture focuses on wireless communication and image processing technologies which are fundamental to automotive engineering.

Prerequisite Subjects

Course Topics

- Basics of wireless LAN- Experimental practice on wireless LAN - Basics of image signal processing- Programming practice on image signal processing

Textbook

Books and papers will be introduced during the classes when necessary.

Additional Reading

Books and papers will be introduced during the classes when necessary.

Grade Assessment

Credits will be awarded to those students who score 60 or more in course works and reports. Grades are as follows: S:100-90, A:89-80, B:79-70, C:69-60, F:59-0.

Notes

Contacting Faculty

Questions are attended during the classes.

Industrial Uses of Radiation (2.0credits) (工業における放射線利用)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Spring Semester	1 Spring Semester
Lecturer	Akira URITANI Professor	

Course Purpose

In this course, students study ionizing radiations, activity, radiation detections, and so on. Students will also study how ionizing radiations are used as powerful tools in manufacturing industries. We will visit radiation related facilities and deepen understanding of industrial use of radiation.

Prerequisite Subjects

nothing in particular

Course Topics

Radioactivity and ionizing radiation

Environmental radiation

Generation of ionizing radiation, nuclear reactions, accelerators

Radiography(X-rays, neutrons)

Radiation detection and measurement

Utilization of ionizing radiations in manufacturing industries

Lab tours (Visiting candidates: National Institute on Nuclear Fusion, Accelerator Facility in the Higashiyama Campus, Aichi Synchrotron Center, Hamaoka Nuclear Power Station, etc. Travel expenses will be supported by Nagoya University for G30 students.)

Textbook

nothing in particular

Additional Reading

nothing in particular

Grade Assessment

Grades will be assigned based on reports.

Grade points

S:100-90

A:89-80

B:79-70

C:69-60

F:59-0

Notes

Travel expenses will be supported by Nagoya University for G30 students.

NUPACE students can also take this course, but travel expenses will not be paid.

Contacting Faculty

Phone ext.3797

e-mail to uritani@energy.nagoya-u.ac.jp

Advanced Experiments and Exercises in Automotive Engineering A (1.0credits) (自動車工学特別実験及び演習A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Practice	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Autumn Semester	1 Autumn Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

The aim of this course is to help students acquire deep understanding of the fundamental science and engineering related to automobiles through experiments.

Prerequisite Subjects

All courses in undergraduate course.

Course Topics

This course deals with the basis of fundamental science and engineering related to automobiles through experiments.

Textbook

Additional Reading

Grade Assessment

Grading will be decided based on attendance and the quality of the students' contribution to the experiments.

Notes

Contacting Faculty

Advanced Experiments and Exercises in Automotive Engineering B (1.0credits) (自動車工学特別実験及び演習B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Practice	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Spring Semester	1 Spring Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

The aim of this course is to help students acquire deep understanding of the fundamental science and engineering related to automobiles through experiments.

Prerequisite Subjects

All courses in undergraduate course.

Course Topics

This course deals with the basis of fundamental science and engineering related to automobiles through experiments.

Textbook

Additional Reading

Grade Assessment

Grading will be decided based on attendance and the quality of the students' contribution to the experiments.

Notes

Contacting Faculty

Latest Advanced Technology and Tasks in Automobile Engineering (3.0credits) (先端自動車工学特論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	Automotive Engineering
	Automotive Engineering		
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
Lecturer	Yukio ISHIDA Designated Professor		

Course Purpose

This course is intended to study the latest advanced technology of automobile engineering from top researchers of universities and industries. The topics of lectures are related to almost all fields of automotive industries.

Prerequisite Subjects

lectures related to fundamental physics, mechanical, electrical and information engineering.

Course Topics

A. Lectures
 1. The Car Industry, Market Trend, Circumstance and Its Future.
 2. Overview of Automotive Development Process.
 3. Observation and Evaluation of Drivers' Behavior Perspective.
 4. Car Materials and Processing.
 5. Movements and Control of a Car.
 6. Safety Engineering for the Prevention of Accidents.
 7. Crash Safety.
 8. Automobile Embedded Computing System.
 9. Wireless Technologies in ITS.
 10. Applications of CAE to Vehicle Development.
 11. Energy Saving Technology for Automobiles.
 12. Fuel and Automobile Catalysts for Environmental Friendly Cars.
 13. Traffic Flow Characteristics.
 14. Cars and Roads in Urban Transportation Context.
 15. Automobile in Aging Society.
 B. Factory Visits
 1. Toyota Motors Corp., 2. Mitsubishi Motors Corp., 3. Yokohama Rubber Co. Ltd., 4. Suzuki Museum, 5. Toyota Higashi-Fuji Technical Center, 6. Nissan Technical Center
 C. Group Research Project
 Several students form one group and each group selects one topic. They investigate and discuss about this topic and make presentations.

Textbook

None (Handout delivered)

Additional Reading

Introduced in the lectures

Grade Assessment

Evaluation will be based on (a) Discussions in the lectures 20%, (b) report for each lecture 20%, (c) group presentation 30%. and (d) report on research subject 30%. It is necessary to attend factory visits.

Notes

Contacting Faculty

Mainly accepted during each lecture. Other general questions are accepted by Professor Yukio Ishida.

<Contact> TEL: 052-747-6797, Email: ishida@nuem.nagoya-u.ac.jp

Introduction to Academic Communication (1.0credits) (コミュニケーション学)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	Graduate Chemistry
	Graduate Chemistry	Automotive Engineering	Automotive Engineering
	Civil and Environmental Engineering Graduate		
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester		
Lecturer	ReikoFURUYA Associate Professor		

Course Purpose

This course is intended to help students learn the skills necessary for making an effective presentation in a language (either Japanese or English) different from their native tongue. Japanese students will make presentations in English, and international students in Japanese.

Prerequisite Subjects

Course Topics

(1) Observing video-taped presentations:By watching model presentations, students will see how an effective presentation is made and learn techniques useful for their own presentations. :(2) Making a presentation:By using presentation techniques discussed

Textbook

none

Additional Reading

Please refer to the Japanese version of this syllabus.

Grade Assessment

Evaluation will be based on presentations and class participation.:

Notes

Contacting Faculty

Research Internship 1 U2 (2.0credits) (研究インターンシップ1 U2)

Course Type	Comprehensive engineering courses	
Division at course	Master's Course	
Class Format	Practice	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

Prerequisite Subjects

Course Topics

Textbook

Additional Reading

Grade Assessment

Notes

Contacting Faculty

Research Internship 1 U3 (3.0credits) (研究インターンシップ 1 U3)

Course Type	Comprehensive engineering courses	
Division at course	Master's Course	
Class Format	Practice	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

Prerequisite Subjects

Course Topics

Textbook

Additional Reading

Grade Assessment

Notes

Contacting Faculty

Research Internship 1 U4 (4.0credits) (研究インターンシップ1 U4)

Course Type	Comprehensive engineering courses	
Division at course	Master's Course	
Class Format	Practice	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

Prerequisite Subjects

Course Topics

Textbook

Additional Reading

Grade Assessment

Notes

Contacting Faculty

Research Internship 1 U6 (6.0credits) (研究インターンシップ 1 U6)

Course Type	Comprehensive engineering courses	
Division at course	Master's Course	
Class Format	Practice	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

Prerequisite Subjects

Course Topics

Textbook

Additional Reading

Grade Assessment

Notes

Contacting Faculty

Research Internship 1 U8 (8.0credits) (研究インターンシップ 1 U8)

Course Type	Comprehensive engineering courses	
Division at course	Master's Course	
Class Format	Practice	
Course Name	Automotive Engineering	Automotive Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Faculty of Automotive Engineering	

Course Purpose

Prerequisite Subjects

Course Topics

Textbook

Additional Reading

Grade Assessment

Notes

Contacting Faculty

Advanced Lectures on Scientific English (1.0credits) (科学技術英語特論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	Automotive Engineering
	Automotive Engineering	Civil and Environmental Engineering Graduate	
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
Lecturer	Part-time Faculty		

Course Purpose

Students will acquire basic skills to summarize their research as a paper in English and to make a presentation in English.

Prerequisite Subjects

Various subjects relating to English

Course Topics

This course focuses on guided practice in written and spoken English in academic and scientific contexts. Students are expected to write short essays, respond to questions from peers and improve their academic quality.

1. Basics of academic writing
2. Unity and coherence
3. Paragraph structures in scientific context
4. Audience-friendly presentation

Textbook

Additional Reading

Glasman-Deal, Hilary. "Science Research Writing: A Guide for Non-Native Speakers of English" Imperial College Press.

Grade Assessment

Quality of written and oral presentation, active participation in discussion, and attendance

Notes

This course is open to native and non-native speakers of English who have not received training in logical and critical thinking skills in English.

Contacting Faculty

Email address to be announced in the first class