

**JAPAN**

# NUSIP2019

Nagoya University Summer Intensive Program

## Latest Advanced Technology & Tasks in Automobile Engineering

+ Japanese Language



Image courtesy of Toyota, Honda, Mitsubishi

Earn college credits while immersed in another culture and engage your intellectual curiosity with the latest findings in automobile industries in Japan that focus and succeed on a level you never thought possible. Join **NUSIP** for six weeks and experience the full range of Japanese cultural life. Course-related excursions will also provide you with an opportunity to discover amazing Japanese cultural scene that has enticed and entranced observers for generations.

### Time schedule:

**Application Deadline: February 14, 2019**

**Course Duration: June 12 to July 18, 2019**

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## Outline

### Courses Offered

1. Seminars on Latest Advanced Technology and Tasks in Automobile Engineering (400 level) (3 credits)
2. Elementary Japanese Language Course (100 level) (3 credits)  
(Students with previous Japanese language experience will be offered a more advanced language course.)
3. Automobile industry factory and laboratory visits
4. Cultural excursions

### Student Capacity

40 overseas students (including maximum of 5 students from the universities NOT having concluded academic exchange agreements with Nagoya University), and 10 Nagoya University students

### Program Fee

- US\$2,500 for students enrolled in the universities having concluded academic exchange agreements with Nagoya University
- US\$2,700 for students enrolled in the universities NOT having concluded academic exchange agreements with Nagoya University

Both fees exclude meal and air-ticket expenses. Accommodations in Nagoya, the Japanese language course, orientation, cultural excursion and social activities are included in the program fees.

(Nagoya University students will have the fee for the Automobile Engineering course waived, but will be charged for cultural excursions and social activities.)

### Language

English

## General Information

### Overview

The 2019 summer program at Nagoya University will provide students with a rare opportunity to connect with and play a role in automobile technology. The program offers academic credits towards students' engineering degrees and beyond the core curriculum, students may further supplement their practical know-how with enrichment as they are exposed to the authentic environment of the automobile factory and research center. A Japanese language course is also offered.

### Study with an Advanced Curriculum that Gets Results

- Each lecture invites you to learn in a new context, in new ways, gaining perspectives that shape the way you engage with the automobile world.
- Each lecture is as demanding as it is rewarding, resulting from the commitment of Nagoya University faculty and, in most cases, collaboration with industrial researchers from Toyota, Honda, Nissan, Mitsubishi and so forth.
- Unlike many study opportunities abroad, the NUSIP program is led exclusively by faculty, ensuring the same quality education that students encounter on their own campus.

### Accommodations

University dormitory (single room)

### Meals

Lunch and dinner are available at the campus cafeteria at a reasonable price.

### Visa

Those who need a visa to enter Japan are responsible for getting a temporary visitor (tourist) visa.

### Health Insurance

NUSIP requires health insurance coverage for all overseas participants. Japan's National Health Insurance system is available to foreigners with long-term visas for Japan only. Therefore, overseas participants must purchase overseas health insurance prior to arrival in Japan. They are required to show proof of health insurance coverage on the first day of summer program.

### Learn from Staff Committed to Excellence

#### Program Director:

Professor Seiichi Miyazaki,  
Vice-Dean, Graduate School of Engineering

#### Chief Coordinator:

Designated professor Yukio Ishida,  
Institute of International Education and Exchange

#### Instructors (Omnibus):

Researchers or engineers from automobile companies and professors at Nagoya University

## Course Overview

### 1. Latest Advanced Technology and Tasks in Automobile Engineering (3 credits)

**Class hours: Three 45-minute classes a day**  
(13:30-14:15, 14:30-15:15, 15:30-16:15).  
Three to four days a week. Days are not fixed.

#### 1 The Car Industry, Market Trend, Circumstance and Its Future

Global market trend by region / Development process overview / Zero emission vehicles / EV & PHEV / Reliability / Safety of EV-based vehicles / Future trend of xEV], *Lecturers: Mr. Kazuaki Iwamoto (Mitsubishi Motors), Mr. Yuji Tozuka (ibid.), Prof. Yukio Ishida (Nagoya Univ.)*

#### 2 Overview of Automotive Development Process

Planning (Market research, Product planning) / Development (Research, Product & technology development) / Production / Sales and Marketing / Impact of Zero Emission on Technology, Design & Society / Nissan LEAF / Future mobility society, *Lecturers: Dr. Chinmoi Pal (Nissan Motors.), Prof. Yukio Ishida (Nagoya Univ.)*

#### 3 Observation and Evaluation of Drivers' Behavior

Driving behavior signal processing, / Data Centric Approach

Using BIGDATA) / Research Topics (Driver identification, Behavior prediction, Driver state prediction) , *Lecturers: Prof. Kazuya Takeda (Nagoya Univ.), Prof. Eijiro Takeuchi (ibid.), Prof. Chiyomi Miyajima (ibid.)*

#### **4 Car Materials and Processing**

Plastic Working Technology / Parts development / Manufacturing method / Use of simple and slim equipment / Metal forming / High strength steel / Tailored blanks / Aluminum alloy / CFRP, *Lecturers: Mr. Hirokazu Morishita (Toyota Motors.), Prof. Nobuki Yukawa (Nagoya Univ.)*

#### **5 Movement and Control of a Car**

Introduction to Automatic Control and Control Engineering / Design of Vehicle Dynamics Control / Concept to design vehicle dynamics / Human motion in a car / Vehicle Dynamics Integrated Management / Estimation of Vehicle Attitude for Stability Control, *Lecturers: Mr. Tatsuya Miyano (Toyota Central R&D Labs., Inc.), Ms. Maiko Hirano (ibid.), Prof. Toru Asai (Nagoya Univ.)*

#### **6 Safety Engineering for Preventing Accidents**

Driving Behavior Analysis and Assistance System / Design of Automated Vehicle / Model predictive control / Automated parking using graph map / Intelligent wheel chair / Innovative Safety Concept in Nissan / Safety Shield Concept, *Lecturers: Prof. Yousuke Akatsu (Nagoya Univ. Formerly researcher at Nissan Motors), Prof. Tatsuya Suzuki (Nagoya Univ.)*

#### **7 Crash safety**

Impact Biomechanics / Crashworthiness / Car-to-car crash / Traffic Injuries / Safety for pregnant women / Vehicle to pedestrian collision], *Lecturers: Prof. Masahito Hitosugi (Shiga University of Medical Science), Prof. Koji Mizuno (Nagoya Univ.)*

#### **8 Automotive Embedded Computing System**

Classification of Automotive Embedded Systems / Engine Management / Automotive Control System / Current Status and Problems / Basic Software for Automated Driving / Toyota automated driving, *Lecturers: Mr. Kazuhiro Kajio (Toyota Motors), Prof. Hiroaki Takada (Nagoya Univ.)*

#### **9 Wireless Technologies in ITS**

Overview of wireless technologies for vehicle / Role of wireless technologies for 'Safe Driving' / VICS, ETC-DSRC, V2V and R2V Communication Systems / Sensors for safe driving (Rader, LIDAR, Camera) / Vehicle positioning system / ITS+Big data, *Lecturers: Dr. Tsuneo Nakata (DENSO Corp.), Dr. Yasuhiro Hirayama (ibid.), Prof. Masaki Katayama (Nagoya Univ.)*

#### **10 Application of CAE to Vehicle Development**

CAE (Computer-aided engineering) / FEM/ BEM / Application to topology optimization / CAE application to vehicle (Noise and vibration, Crash safety, Strength and reliability, Fluid dynamics, Ride comfort), *Lecturers: Dr. Yuichi Kitagawa (Toyota Motor Corp.), Prof. Toshiro Matsumoto (Nagoya Univ.)*

#### **11 Energy Saving Technology for Automobiles**

The Latest Examples of Energy-Saving Vehicles (Hybrid vehicles, Electric vehicles, Fuel cell vehicles) / Diversification of automotive fuel / Automotive Power Electronics / Autonomous Technology and Infrastructure, *Lecturers: Mr. Tatsuo Teratani (Toyota Motor Corp.), Prof. Shinji Doki (Nagoya Univ.)*

#### **12 Automated Driving**

History of automated vehicles / Digital Infrastructure-High resolution 3D road maps / 3D LiDAR-based sensor fusion / Field evaluation and parameter optimization / Traffic accidents (Uber, Waymo, Google) / ITS (Intelligent Transport System) & its Sensing Technology, *Lecturers: Dr. Nobuyuki Ozaki (Toshiba Infrastructure Systems & Solutions Corp.), Prof. Yoshiki Ninomiya (Nagoya Univ.)*

#### **13 Fundamentals of Traffic Flow Characteristics**

Transportation and traffic engineering / Microscopic and macroscopic analysis / Traffic Flow Analysis / Traffic Congestion and Bottleneck, *Lecturer: Prof. Hideki Nakamura (Nagoya Univ.)*

#### **14 Cars and Roads in Urban Transportation Context**

Transportation Systems in Cities / Environmentally Sustainable Transport-EST / Parking Deposit System-PDS / Urban Deployment of EST-TDM Package Policies (Road pricing, Car-sharing, P&R) / Compact city / Substitution by telecommunication, *Lecturer: Prof. Takayuki Morikawa (Nagoya Univ.)*

#### **15 Automobiles in Aging Society**

Aging society / Traffic accidents related to older drivers / Meaning of driving for elderly / Approach to drive longer and safer, / Classify Driver Mental Workload, *Lecturers: Prof. Hirofumi Aoki (Nagoya Univ.), Prof. Le Anh Son (ibid.)*

##### **Evaluation:**

Attendance & participation: 20%  
Written reports for seminars (15 reports): 20%  
Presentation of group project work: 30%  
Report of group project work: 30%

## **2. Japanese (3 credits)**

**Class hours: Approximately two hours per day for 6 weeks (total 45 hours)**

### 2.1 Elementary Japanese

This class is designed for students who have little or no knowledge of Japanese. This level aims to acquire the most essential language patterns for everyday life, and be able to express intentions in uncomplicated adult-level Japanese.

### 2.2 Intermediate Japanese

This class is designed for students who have already learned Japanese to some extent.

### 2.3 Advanced Japanese

This class is designed for students who can speak Japanese rather fluently.

## 3. Automobile Industry Factory and Laboratory Visits

Toyota,  
Mitsubishi,  
Nissan,  
Suzuki,  
Yokohama Rubber,  
National Traffic Safety and  
Environment Laboratory.



## 4. Cultural Excursions

Kyoto, Nara and Tokyo



## Eligibility

· Applicants **MUST** be enrolled in universities having concluded academic exchange agreements with Nagoya University at the inter-university level or with the Graduate School of Engineering at the inter-school level. However, maximum of 5 students from the universities NOT having concluded academic exchange agreements with Nagoya University may join this program.

· Applicants **MUST** be of senior undergraduate or graduate status during the NUSIP period (including junior undergraduates who are completing their junior program).

· Applicants who are non-native speakers of English must possess a TOEFL score of 550 <CBT =213; iBT=79>, TOEIC score of 730, an IELTS overall band score of 5.5, or the equivalent, and should attach a copy of the official score record to the application. However, those studying full time at a university where the medium of instruction is the English language are exempted from this requirement.

## Application Procedures

All applicants are requested to submit their applications through the NUSIP online application system during the application period shown below.

Application Period: January 7, 2019 - February 14, 2019. Applicants will be asked to upload the following documentation in a PDF format (photograph in a JPEG format); hence, preparation of the relevant materials in advance of the closing dates stipulated below is important.

- Statement of purpose (written in English with minimum 400 words)
- Official transcript of academic records in English
- Health certificate: Students are requested to use the designated NUSIP Health Certificate form available on the application site.
- (Non-native English Speaker) Supporting documents of English Proficiency (i.e., TOEFL, IELTS, TOEIC)
- Photograph with solid-colour background, showing a close-up of the applicant's full head and upper shoulders. Sunglasses / tinted glasses, or headwear should not be worn, unless this is for religious or medical reasons.
- A copy of the passport page which shows the applicant's name, date of birth and nationality, where available.
- Curriculum Vitae (CV)

### Application Deadline

Online application deadline is **February 14, 2019**

### Enquiry

For any enquiries, please send an e-mail to [nusip@engg.nagoya-u.ac.jp](mailto:nusip@engg.nagoya-u.ac.jp).

### Notification of Results

The results of document screening, as conducted by Nagoya University, will be made available to applicants by **March 14, 2019**.