



WASEDA University



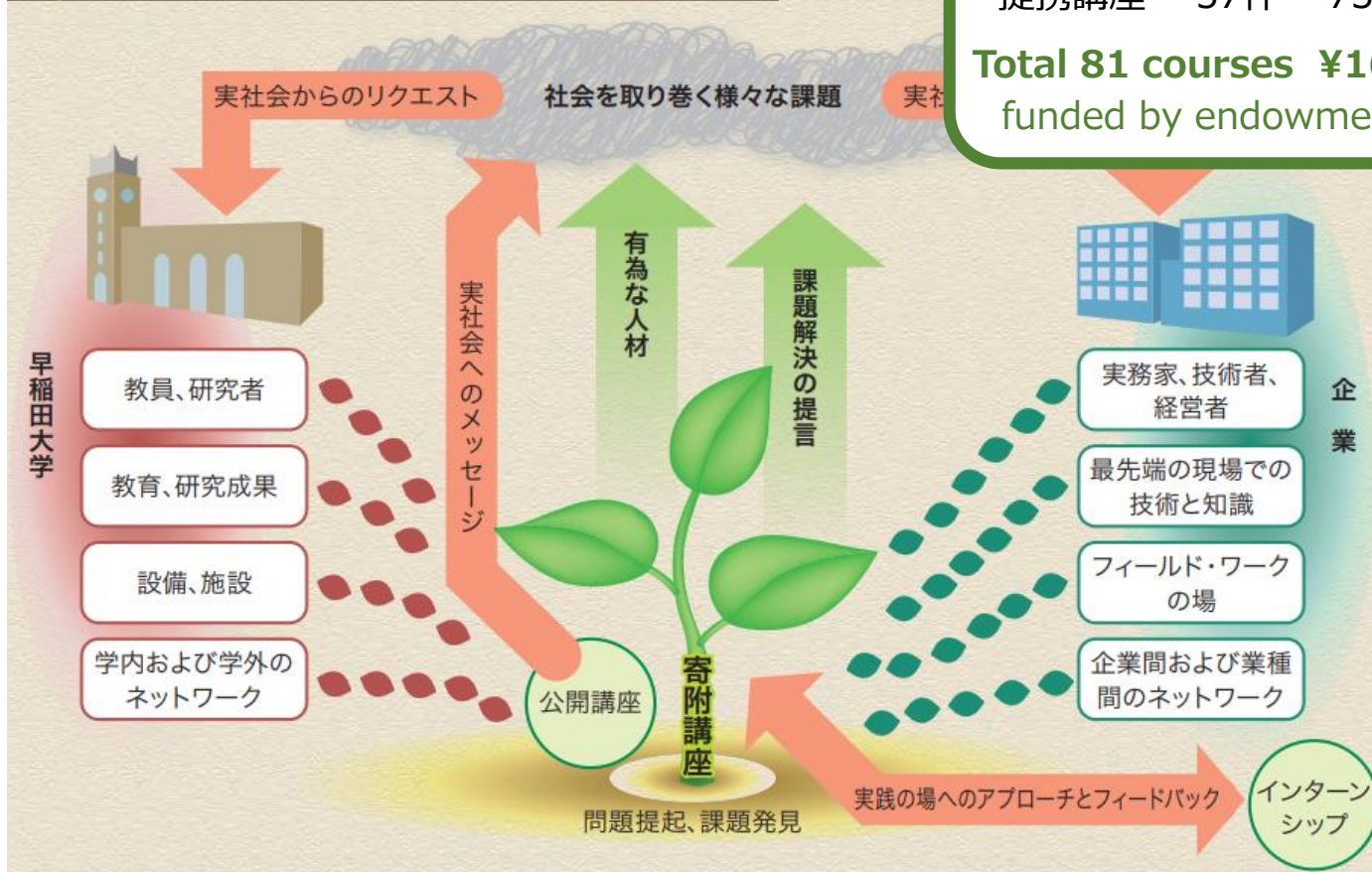
Collaboration Education Program with AVL

Jin KUSAKA, Professor, Ph.D

WASEDA UNIVERSITY

Waseda University offers a wide variety of courses funded by corporate endowments. They provide the students with opportunities to learn about practical knowledge from leading experts in fields related to the endowed courses.

本学が考える寄附講座のイメージ



2017年度受入実績		
寄附講座	24件	96,000,000円
提携講座	57件	73,602,750円
Total 81 courses ¥169,602,750		
funded by endowments in 2017		

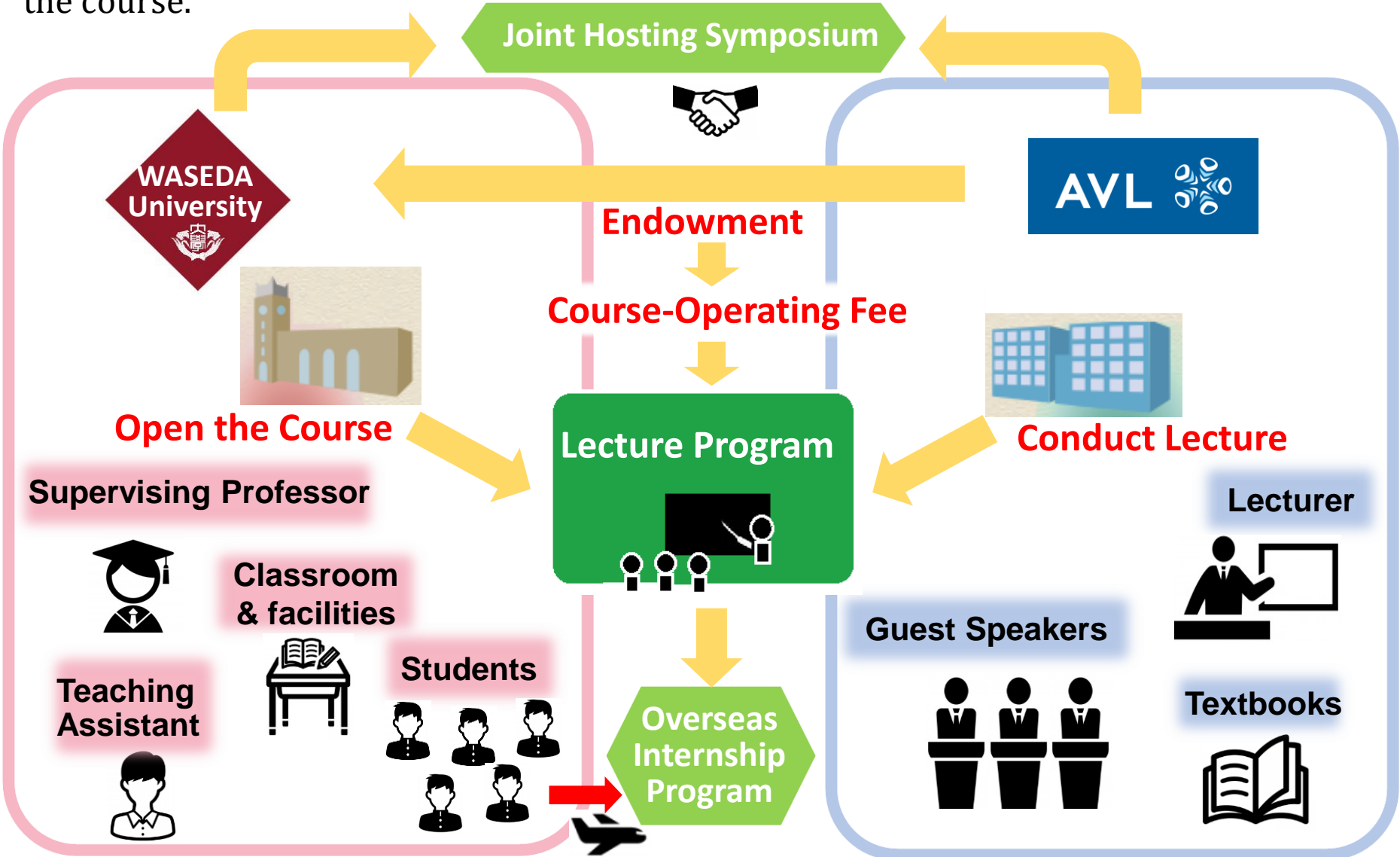
Waseda-AVL Endowed Course



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The chart below shows the structure of roles between Waseda Univ. and AVL to operate the course.



Overseas Internship Program in Graz



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Since 2017, our endowed course has invited two of deserving students to AVL Head Office in Graz, Austria.

Applicant Eligibility



Students • •

1. who wish to participate in the internship program
2. who perform well on every-week quiz
3. who have excellent English skills



can get
Tickets to



**Internship Program
in Graz**

Participants of the Program

2017

2018



Students' Report Overall schedule



Internship period: 10-21 Sept., 2018

9/08 Sat.	Arrival in Graz
9/10 Mon.	<ul style="list-style-type: none">• Orientation Session• Overview of AVL, Business unit A, IST
9/11 Tue.	Welcome Newcomer Workshop
9/12 Wed.-14 Fri.	Training "Automotive Technology Basic"
9/17 Mon.	TUG guided tour
9/18 Tue.-19 Wed.	<ul style="list-style-type: none">• Research Workshop• Presentation
9/20 Thu.	<ul style="list-style-type: none">• AVL guided tour• ADAS demo• Overview of Sales and Business Development
9/21 Fri.	<ul style="list-style-type: none">• Overview of Calibration• Wrap-up meeting
9/22 Sat.	Departure to Japan



1. Newcomers Integration Workshop:

➤ Division overview:

- AST (Advanced Simulation Technology)
- ITS (Instrumentation and Test Systems)
- PTE (Powertrain Engineering)

➤ Ice-break with new AVL employees, discussion

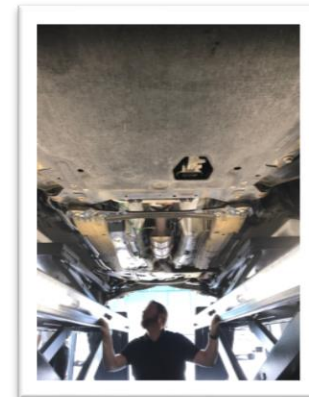
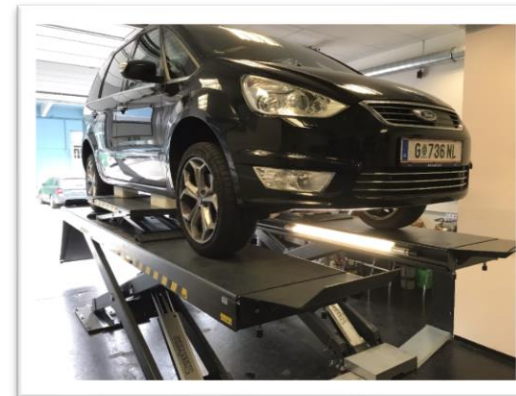
- Future vehicles in 50 years later
- Difficulties of communications between different technical centers



2. Three days training of “Automotive Technology Basics”:

➤ Gained basic knowledge and history of:

- ICE (internal combustion engine)
- Transmission
- Suspension
- Hybrid Vehicles
- Electric Vehicles
- Fuel Cell Vehicles



Practice with real vehicle during the training

~ Overseas Internship Program in Graz ~ Students' Report Workshop

1. Introduction

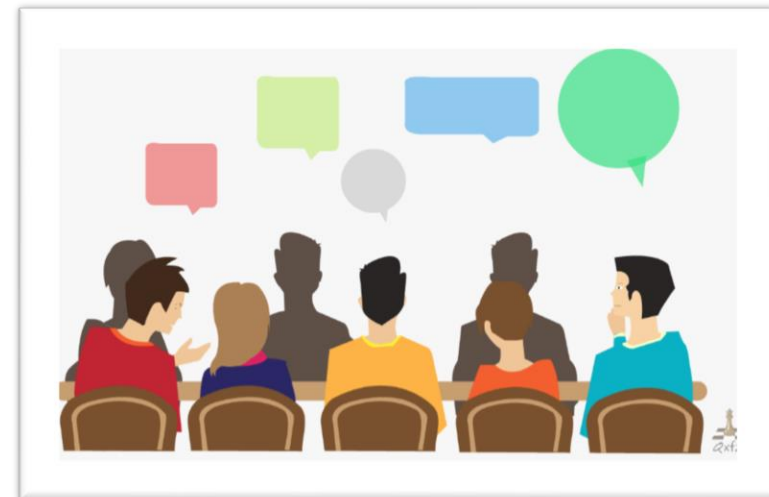
- Our master/bachelor thesis overview

2. Subjects

- Our perspectives on technology trends
 - Combustion engine, Electric Vehicle & Fuel Cell
 - Governmental boundaries & legislation
 - Energy carriers, storage & distribution
- Why AVL started and grew up in Graz
- Engineering Service Providers in Japan
 - Future of ESPs in Japan
 - Risks and chances for AVL
- New players coming up from Japan & China
- Cultural differences between Austria & Japan
- Our impressions on AVL



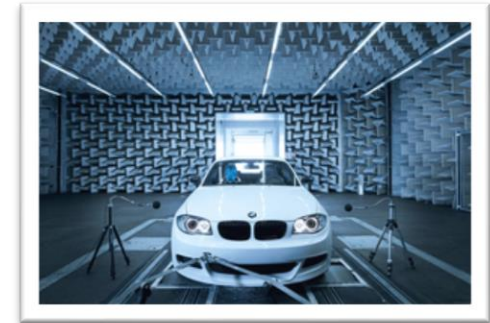
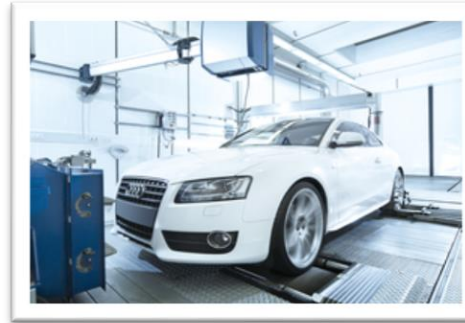
(Present in front of a few AVL employees and managers)



~ Overseas Internship Program in Graz ~ Students' Report AVL Tour

1. AVL internal tour:

- Chassis dynamo
- Exhaust gas analyzer
- Noise vibration testbed
- Engine testbed



2. ADAS (Advanced Driver Assistance Systems) experience:



Impressions:

We were not only able to see the advanced technology of the testing equipment, but also to experience the working atmosphere in AVL. This gave us a good opportunity to think positively about future technology in automotive industry.

~ Overseas Internship Program in Graz ~ Students' Report

TUG Tour



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TUG: Technische Universität Graz

- Old and new campus
- FSI (Frank Stronach Institut)
- AVL-TUG Transmission center
- TUG Racing team



Old campus of TUG



New campus of TUG



TUG Racing team



Ceremony hall of old campus

Impressions:

The campus of TUG is fulfilled with history and high technology. In the Transmission Center, we saw students studying and working with employees in a harmonious way, which is helpful for accelerating the development. The student members from the TUG racing team showed us their tremendous knowledge and passion on student formula racing.

~ Overseas Internship Program in Graz ~ Students' Report Photos



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Lecture Schedule & Outline 2019

on Friday at 14:45 - 16:15



AVL

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	Date	Lecture (English title)	Outline (2 or 3 sentences)	Covered by
1	4/12	General Lecture Overview, AVL introduction and introduction into engine development	<ul style="list-style-type: none"> •Short introduction into the technology of combustion engines and engine development 	Noyori
2	4/19	Automotive engine development in the future	<ul style="list-style-type: none"> •Future Passenger Car Powertrain Trends beyond 2020 considering legislation and performance 	Alge
3	4/26	Powertrain System Electrification-1	<ul style="list-style-type: none"> •Introduction •Definition and classification of hybrid vehicle concepts •Hybrid vehicle modes 	Noyori
4	5/10	Powertrain System Electrification-2(New)	<ul style="list-style-type: none"> •Components of a hybrid drivetrain 	Noyori
5	5/17	Overview Engine Development Process	<ul style="list-style-type: none"> •Summarizes AVL's approach towards developing a new engine 	Bierbrauer
6	5/24	Front loading process, virtual engine development	<ul style="list-style-type: none"> •Concept of front loading •Description of latest technologies in virtual engine development using simulation tools: <ul style="list-style-type: none"> •1-dimensional tools for defining main engine parameters and engineering targets •3-dimensional tools for detailed analysis for product definition and validation 	Bierbrauer
7	5/31	Concept design engine	<ul style="list-style-type: none"> •Technology selection •Definition of main parameters •Design methodology 	Hold
8	6/7	Thermodynamic Layout Engine	<ul style="list-style-type: none"> •Thermodynamic methodology to define optimum engine layout 	Noyori
9	6/14	Systematic Engine Validation	<ul style="list-style-type: none"> •Design Verification Plan & Reporting (DVP&R) •Systematic test planning (load matrix) 	Noyori
10	6/21	Base Engine Simulation	<ul style="list-style-type: none"> •Examples of simulations implemented in the engine development process 	AST
11	6/28	Functional engine testing, powertrain testing	<ul style="list-style-type: none"> •Examples of functional testing on component level, engine level and powertrain level 	Bierbrauer
12	7/5	Test environment and measurement devices	<ul style="list-style-type: none"> •Test equipment required for powertrain development •Model based powertrain testing 	Alge
13	7/12	Legislation, Engine Calibration,	<ul style="list-style-type: none"> •Legislation for each country •Advanced methodology of engine calibration 	Bierbrauer
14	7/14	Excursion to AVL Japan Technical Center	<ul style="list-style-type: none"> •Facility tour to observe advanced actual testing and test equipment 	all

Our New Approach 2019



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Create Posters & Advertising to attract students



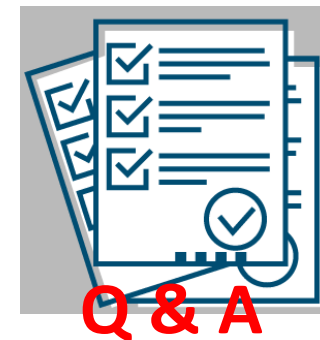
Distribute Supplemental Booklets for minor revisions to the textbooks



Increase the number of Guest Speakers



Conduct Questionnaire Survey



Questionnaire Survey Results part 1

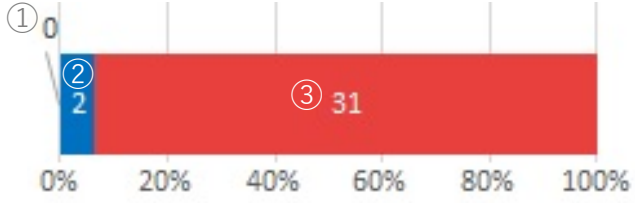


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To check the prior knowledge level of the students, we conducted questionnaire survey in the beginning of the course.

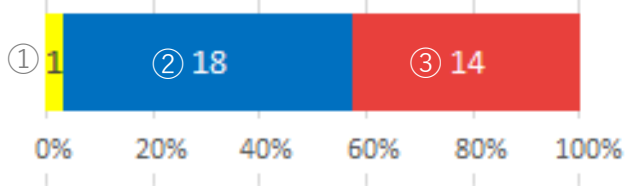
(1) Regarding the automotive industry in Japan

- ① It is a small-scale industry (less than about 1% occupancy) in manufactured products
- ② It is a medium-scale industry (about 10% or less occupancy) in manufactured products
- ③ It is a large-scale industry (about 20% occupancy) in manufactured products



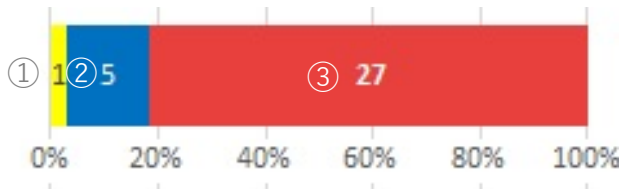
(2) Regarding the development system for automotive powertrains

- ① The development is mainly implemented by experiment and trial production
- ② The development is implemented by a combination of experiment, simulation and trial production, but the percentage of experiment and trial production is high
- ③ The development is mainly implemented by simulation and trial production



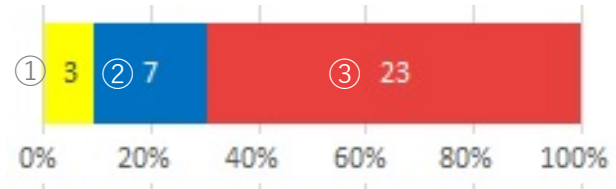
(3) Regarding the automotive industry -1

- ① The number of passenger cars sold in the world is about 1 million units / year.
- ② The number of passenger cars sold in the world is about 10 million units / year.
- ③ The number of passenger cars sold in the world is about 100 million units / year.



(4) Regarding the automotive industry -2

- ① It is expected that the global car sales will decrease from now on.
- ② It is expected that the global car sales will not change from now on.
- ③ It is expected that the global car sales will increase from now on.

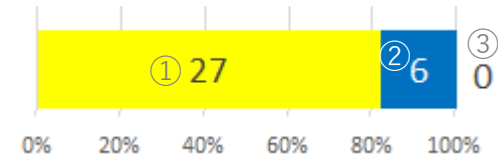


Questionnaire Survey Results part 2



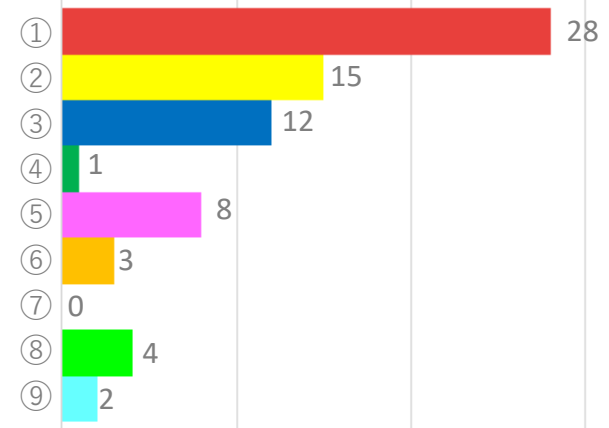
(5) In Europe, there are many companies called 'engineering service providers' that originate from universities with high level technologies; and they may be commissioned by other companies such as joint researches on engine development, etc. Regarding such engineering service providers companies:

- ① I do not know any of them.
- ② I know 1 or 2 of them. (please give the names of the companies)
- ③ I know a lot of them. (please give the names of the companies)



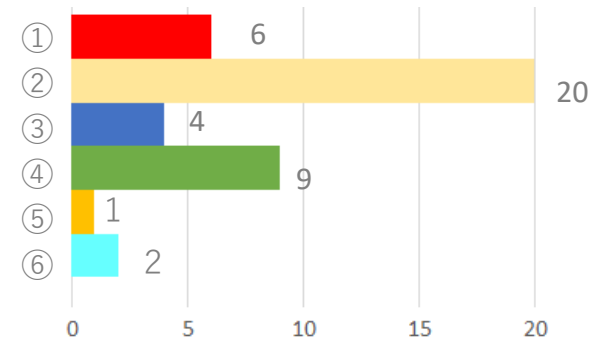
(6) Why did you take this class? (multiple answers can be chosen.)

- ① Because I am interested in automotive industry.
- ② Because this class is offered by a company, and it sounds interesting.
- ③ Because I can learn knowledge from a global view.
- ④ Because I saw the posters and leaflets of the course.
- ⑤ Because I want to participate the overseas internship.
- ⑥ Because this class uses English textbook.
- ⑦ Because this class seems easy to obtain credits.
- ⑧ This class fits my time schedule.
- ⑨ Others



(7) What is your impression of this class?

- ① This is a class that can help me become familiar with the entire business.
- ② This is a maniac class that is specialized in learning about automotive industry.
- ③ This class seems to be helpful for job hunting.
- ④ This is an international class that uses English.
- ⑤ This is a class with difficult course contents.
- ⑥ This is a class with easy course contents.



Action Going Forward



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Revise the textbooks



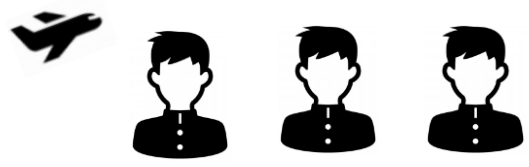
Increase the numbers of students who take the course...



Our Next Step

Acquisition of 50 students taking the course may allow an additional student to join the Internship Program ?!

... KUSAKA's Wish



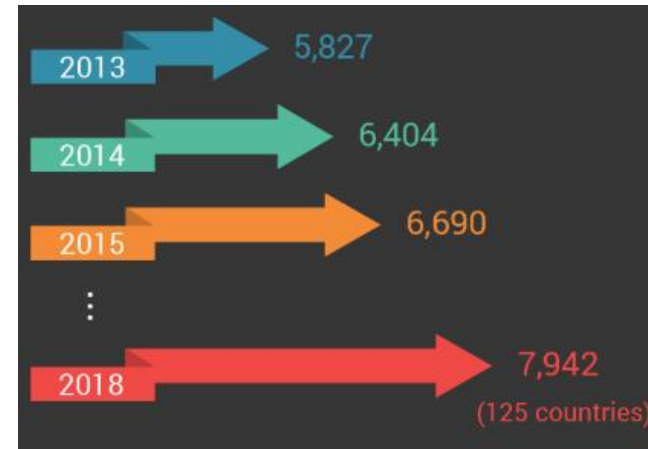
Initiatives for the Future



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For AY2018-2019, 7,942 international students from 125 countries were studying at Waseda Univ.



Number of International Students at Waseda Univ.

This indicates globalization is expanding at a rapid pace in university education.

With the merit of cooperation between industry and academia, our endowed course provides a wide range of opportunities to help students develop an international perspective.

Furthermore, we believe our effort leads to contributions to the society by fostering human resources.

Keep your eyes on our further improvement!

