Course Title 授業科目名	International Communication Seminar 1
Course Category 授業科目区分	Professional Skill Development
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 / Required course
Instructor 担当教員名	The faculty of AMS.
Prerequisite 履修条件	
Course Outline 授業の概要	Presentation in English language of the existing research results of the students in Automotive Science, questions and answers session guided by the faculty. Compulsory course in order to take SIC-2 and obtain the 2 credits.
General Course Objectives 全体の教育目標	Practice of presenting research results and discussing them in related areas. Creating the material in PowerPoint for presentation in English language, increase the presentation skills, targeting communication and discussion. It is pursued the active participation in the students in order to acquire relevant knowledge among all.
Specific Course Objectives 個別の学習目標	Recreate the experience of how to participate and present in English language research results in an international academic conference.
Course Plan 授業計画	All presentations are conducted in English language. Following the questions and answers session, guidance is conducted by the faculty. A portion of the 2 credits are allotted to the course during the first year according to the time utilized in the seminar.
Keywords キーワード	International communication. English. Presentation. Discussion.
Method of Instruction 授業の進め方	Guidance by the faculty prior the presentation, in its preparation, content and order. Mutual evaluation on the presentations by the students, and comments on points of improvement. Other details and important points

	about the presentation will be informed in advance.
Text and References 教科書及び参考図書	
Office Hours 学習相談	
Grading 試験・成績評価の方法	Points to evaluate are presentation and discussion. Presentation: 60% Discussion: 40%
Notes その他	

Course Title 授業科目名	International Communication Seminar 2
Course Category 授業科目区分	Professional Skill Development
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 / Required course
Instructor 担当教員名	The faculty of AMS.
Prerequisite 履修条件	
Course Outline 授業の概要	Presentation in English language of the existing research results of the students in Automotive Science, questions and answers session guided by the faculty. Compulsory course with SIC-1 in order obtain the 2 credits.
General Course Objectives 全体の教育目標	Practice of presenting research results and discussing them in related areas. Creating the material in PowerPoint for presentation in English language, increase the presentation skills, targeting communication and discussion. It is pursued the active participation in the students in order to acquire relevant knowledge among all.
Specific Course Objectives 個別の学習目標	Recreate the experience of how to participate and present in English language research results in an international academic conference.
Course Plan 授業計画	All presentations are conducted in English language. Following the questions and answers session, guidance is conducted by the faculty. A portion of the 2 credits are allotted to the course according to the time utilized in the seminar.
Keywords キーワード	International communication. English. Presentation. Discussion.
Method of Instruction 授業の進め方	Guidance by the faculty prior the presentation, in its preparation, content and order. Mutual evaluation on the presentations by the students, and comments on points of improvement. Other details and important points about the presentation will be informed in advance.

Text and References 教科書及び参考図書	
Office Hours 学習相談	
Grading 試験・成績評価の方法	Points to evaluate are presentation and discussion. Presentation: 60% Discussion: 40%
Notes その他	

Course Title 授業科目名	Automotive Science Seminar 1
Course Category 授業科目区分	Professional Skill Development
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 / Required course
Instructor 担当教員名	Advisor
Prerequisite 履修条件	
Course Outline 授業の概要	Instruct students to set up their research theme through workshop and exercises. Support the students to find practical themes and how to address the themes. 修士での研究テーマの設定を演習や実習を通じて指導する。特に自発的に実践的なテーマを発見し, そのテーマにどのように取り組むべきか, を指導する。
General Course Objectives 全体の教育目標	
Specific Course Objectives 個別の学習目標	
Course Plan 授業計画	
Keywords キーワード	
Method of Instruction 授業の進め方	
Text and References 教科書及び参考図書	

Office Hours 学習相談	
Grading 試験・成績評価の方法	
Notes その他	

Course Title 授業科目名	Automotive Science Seminar 2
Course Category 授業科目区分	Professional Skill Development
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 / Required course
Instructor 担当教員名	Advisor
Prerequisite 履修条件	
Course Outline 授業の概要	Following the output in Seminar Automotive Science 1, students will be guided to build analytical framework by reviewing previous studies, and to prepare for empirical studies and experiments. Seminar Automotive Science 1 で設定したテーマにそって，先行研究のレビューに基づくテーマの分析枠組みを策定し, それに基づく実証分析や実験計画の具体化を図れるように指導する。
General Course Objectives 全体の教育目標	
Specific Course Objectives 個別の学習目標	
Course Plan 授業計画	
Keywords キーワード	
Method of Instruction 授業の進め方	
Text and References 教科書及び参考図書	

Office Hours 学習相談	
Grading 試験・成績評価の方法	
Notes その他	

Course Title 授業科目名	Automotive Science Seminar 3
Course Category 授業科目区分	Professional Skill Development
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 / Required course
Instructor 担当教員名	Advisor
Prerequisite 履修条件	
Course Outline 授業の概要	Students will be supported to implement empirical studies, including data collection and experiments, and to analyze the data and findings gained from the study. A part of the results will be written up as academic papers and published for academic conferences or journals. 資料収集や実験などの実証的な研究活動を促進し, 得られたデータの整理と発見事実の理論的な考察を深めるように指導する。その一部は学会や研究会への対外的な発表ができるように論文やレポートにまとめる。
General Course Objectives 全体の教育目標	
Specific Course Objectives 個別の学習目標	
Course Plan 授業計画	
Keywords キーワード	
Method of Instruction 授業の進め方	

Text and References 教科書及び参考図書	
Office Hours 学習相談	
Grading 試験・成績評価の方法	
Notes その他	

Course Title 授業科目名	Automotive Science Seminar 4
Course Category 授業科目区分	Professional Skill Development
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 / Required course
Instructor 担当教員名	Advisor
Prerequisite 履修条件	
Course Outline 授業の概要	The students will be supported to write a master's thesis. Supervising professors will help students ensure that the master's thesis can not only meet academic requirements but also contribute to practical issues about automotive science. 修士論文として研究成果を取り纏めるように指導する。修士論文が学術的に高い水準に達しているばかりでなく, オートモーティブサイエンスとして実践的な課題に応えるものになっていることに留意して, 研究成果の総合化を指導する。
General Course Objectives 全体の教育目標	
Specific Course Objectives 個別の学習目標	
Course Plan 授業計画	
Keywords キーワード	
Method of Instruction 授業の進め方	
Text and References 教科書及び参考図書	

Office Hours 学習相談	
Grading 試験・成績評価の方法	
Notes その他	

Course Title 授業科目名	Automotive Advanced Material Science
Course Category 授業科目区分	Basic Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	Advanced Materials for Automobiles and their related technology
Course Type and Schedule 授業方法及び開講学期	Lecture style and Autumn Semester
Use language 使用言語	English
Credits 単位数	2/ Elective
Instructor 担当教員名	Tatsumi Ishihara (2868, ishihara@cstf.kyushu-u.ac.jp)
Prerequisite 履修条件	None
Course Outline 授業の概要	In this class, structure, physical and functional properties of various inorganic and organic materials will be lectured.
General Course Objectives 全体の教育目標	Understanding the structure of inorganic and organic materials and its relationship between various properties.
Specific Course Objectives 個別の学習目標	Objective of this class are to understand (1) why inorganic and organic materials show various physical and functional properties and (2) how the materials contribute to upcoming automobiles.
Course Plan 授業計画	1) Li-ion battery 2) Na-ion battery 3) Li-air and Fuel cells 4) Organic materials in automobile 5) Fundamental of flat-panel displays 6) Liquid crystal and electroluminescence displays 7) Oxide ion conductor and fuel cell 8) Electrode reaction 9) Production of Hydrogen and fuel cell vehicle 10) Introduction to polymer science 11) Structure of polymeric materials 12) Physical properties of polymeric materials 13) Supplementary explanation 14) Supplementary explanation 15) Examination

Keywords キーワード	Inorganic materials, Crystal structure, Semiconductor, Magnetics, Ionic conductors, Optics, Polymeric materials, Soft materials, Intercalation, Redox reaction.
Method of Instruction 授業の進め方	Teach and Discuss
Text and References 教科書及び参考図書	
Office Hours 学習相談	9:30-17:30
Grading 試験・成績評価の方法	Attendance and Examination
Notes その他	

Course Title 授業科目名	Automotive Dynamics
Course Category 授業科目区分	Basic Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	Regular Lectures, First Period
Use language 使用言語	English
Credits 単位数	2 /Elective
Instructor 担当教員名	E.MURASE, K.ABE,T.INOUE, H.NOGUCHI
Prerequisite 履修条件	None
Course Outline 授業の概要	
General Course Objectives 全体の教育目標	Students will gain understanding fundamentals of Automotive Dynamics.
Specific Course Objectives 個別の学習目標	Students will gain understanding in 1.Strength of Materials 2. Fluid Mechanics 3. Thermodynamics 4. Dynamics of Machinery.
Course Plan 授業計画	Chapter 1:.Strength of Materials Chapter 2: Fluid Mechanics Chapter 3: Thermodynamics Chapter 4: Dynamics of Machinery.
Keywords キーワード	Strength of Materials, Fluid Mechanics, Thermodynamics, Dynamics of Machinery.
Method of Instruction 授業の進め方	Throughout the course there will be assignments
Text and References 教科書及び参考図書	
Office Hours 学習相談	

Grading 試験・成績評価の方法	Attendance of the class 50%, Assignments 50%
Notes その他	

Course Title 授業科目名	Automotive Information Control System
Course Category 授業科目区分	Basic Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 /Elective
Instructor 担当教員名	Information and Control Field faculty
Prerequisite 履修条件	None
Course Outline 授業の概要	The students shall learn basical things on information technonogy and system control technology related to automobiles of the next generation, including embeded software/hardware, control theory, power electronics, electric device technology etc.
General Course Objectives 全体の教育目標	
Specific Course Objectives 個別の学習目標	
Course Plan 授業計画	
Keywords キーワード	
Method of Instruction 授業の進め方	
Text and References 教科書及び参考図書	
Office Hours 学習相談	

Grading 試験・成績評価の方法	
Notes その他	

Course Title 授業科目名	Automotive Human Science
Course Category 授業科目区分	Basic Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 /Elective
Instructor 担当教員名	Human Science Field faculty
Prerequisite 履修条件	None
Course Outline 授業の概要	自動車と人間のかかわりという観点から、運転者の心理特性や運転特性、運転者教育、道路案内標識システム、経路誘導、交通流に関する諸理論について、講義および実習をおこなう。 This course is designed to provide you with the theories and models on the psychology of driving, crash countermeasures, road signpost system, route guidance system, and traffic flow regarding the relationship between automotive and human being.
General Course Objectives 全体の教育目標	
Specific Course Objectives 個別の学習目標	

Course Plan 授業計画	
Keywords キーワード	
Method of Instruction 授業の進め方	
Text and References 教科書及び参考図書	
Office Hours 学習相談	
Grading 試験・成績評価の方法	
Notes その他	

Course Title 授業科目名	Automotive Social Science
Course Category 授業科目区分	Basic Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	Lecture and Class discussion 2nd semester
Use language 使用言語	English
Credits 単位数	2 /Elective
Instructor 担当教員名	Toshiyuki FUJITA, Takefumi MOKUDAI
Prerequisite 履修条件	
Course Outline 授業の概要	After overviewing issues in automotive industry, the course provides basic knowledge how those issues will be addressed by social sciences. Economic, social and environmental impacts posed by cars (and automotive industry) will be discussed by applying economic theories, while challenges faced by auto makers and suppliers will be explained from management perspectives.
General Course Objectives 全体の教育目標	To gain knowledge on social, economical, and ecological issues of the automotive industry and to learn concepts and theories applicable to analyzing the challenges in the industry.
Specific Course Objectives 個別の学習目標	After studying this course, students should have a good understanding of: ✓ Overall picture of automotive industry; ✓ Social, economic and ecological issues and challenges that automotive industry faces; ✓ Key terms and theories of social sciences that will be applicable to challenges of the automotive industry.
Course Plan 授業計画	Part I Overview of Automotive Industry (MOKUDAI) #01 Introduction #02 Historical background of the industry #03 Present state and challenges of OEMs #04 Present state and challenges of suppliers Part II Managerial and Industrial Challenges (MOKUDAI)

	#05 Management and operations of automotive industry #06 R&D: Practical challenges and academic studies #07 Production operations: Practical challenges and academic studies #08 Supply chain: Practical challenges and academic studies #09 Strategy: Practical challenges and academic studies #10 Strategic and managerial challenges on environment and safety issues Part III Environmental Issues and Policies (FUJITA) #11 Policies for fuel consumption regulation #12 Recycle of vehicles #13 Environmental evaluation by consumers on the next generation vehicles #14 Costs and benefits of diffusion of the next generation vehicles #15 Automotive industry and local economy (MOKUDAI)
Keywords キーワード	Automotive industry, international competitiveness, ecology, innovation, environmental and energy issues
Method of Instruction 授業の進め方	Lecture and class workshop
Text and References 教科書及び参考図書	References will be instructed or provided at class.
Office Hours 学習相談	Make appointments through email.
Grading 試験・成績評価の方法	Evaluate by assignments and contribution to class discussions.
Notes その他	Attendance at class (at least 2/3) is compulsory. Will be rated through assignments and contribution to class discussion.

Course Title 授業科目名	Corporate Strategy in Automotive Industry
Course Category 授業科目区分	Basic Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 / Required course
Instructor 担当教員名	MOKUDAI, Takefumi (mokudai.takefumi.076@m.kyushu-u.ac.jp)
Prerequisite 履修条件	
Course Outline 授業の概要	Today automotive firms face multiple challenges, including growing demand for eco-friendly products with more safety features, rapid growth in emergent markets as well as stagnant pace of market growth in advanced economies. This course provides students with fundamental concepts and theories of strategy that will enable them to understand and practice strategic management in automotive industry. With those conceptual tools strategic challenges and actions taken by major automotive firms will be discussed.
General Course Objectives 全体の教育目標	To gain knowledge of an intermediate level of strategic management theories and have strategic insights on challenges that OEMs and suppliers face.
Specific Course Objectives 個別の学習目標	After studying this course, students should have a good understanding of: ✓ Strategic issues and challenges that automotive OEMs and suppliers have faced; ✓ The meaning of strategy; ✓ Key terms of strategic management; and ✓ How to formulate and evaluate strategies.
Course Plan 授業計画	#01 Introduction #02 Environment, strategy and organization #03 Gaining and sustaining competitive advantage #04 Analysis of external environment #05 Analysis of internal context #06 Workshop (1): Business case analysis

	#07 Workshop (2): Business case analysis #08 Business strategy #09 Globalization vs. localization #10 Workshop (3): Business case analysis #11 Workshop (4): Business case analysis #12 Corporate strategy #13 Workshop (5): Business case analysis #14 Workshop (6): Final presentation #15 Summary and exam
Keywords キーワード	Strategy, competitive advantage, electric vehicle
Method of Instruction 授業の進め方	Strategic theories and concepts will be provided by lectures, while case analysis and class discussion will be done through workshops. Students will be requested to go through reading assignments to prepare for class discussion and workshop.
Text and References 教科書及び参考図書	List of reading assignment will be provided at the first class.
Office Hours 学習相談	Office hours: Tuesday 13:30-15:00 or by appointment Office: Room 211, Open Learning Plaza, Ito campus
Grading 試験・成績評価の方法	Contribution to class discussion 30% Quality of case analysis 40% Final exam 30%
Notes その他	

Course Title 授業科目名	Automotive Science and Engineering
Course Category 授業科目区分	Basic Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	Selected topics in automotive science and engineering.
Course Type and Schedule 授業方法及び開講学期	Lecture style with debates and quizzes. Spring semester. Wednesday, the 2nd period (10.30-12.00)
Use language 使用言語	English
Credits 単位数	2 / Required course
Instructor 担当教員名	Kenshi Itaoka, Stephen Lyth and Nicola Perry
Prerequisite 履修条件	
Course Outline 授業の概要	Some relevant topics in automotive science and engineering that graduate students need to know are covered.
General Course Objectives 全体の教育目標	The students shall learn current automotive fuel supply and use pathways where fossil fuel is used internal combustion engine (ICE) and future automotive fuel supply and use pathways with various low carbon fuels. The students shall gain an understanding of some selected state-of-the-art topics about technology enabling supply and use of cleaner automotive fuel.
Specific Course Objectives 個別の学習目標	The student shall learn about supply and use pathways of gasoline and diesel oil. Also, they student shall learn about supply and use pathways of electricity, hydrogen and biofuel. Students will be able to compare various emissions-lowering technologies, describe their operation, and understand their development based on underlying materials properties. Students will learn about polymer electrolyte membrane fuel cells (PEFCs), including the fundamental principles, materials, and applications.
Course Plan 授業計画	1.- Overview of energy supply and use in the automobile sector. 2.- Introduction to ceramics for automotive energy supply and use 3.- Ceramics for energy conversion in automotive applications (SOFC, solar, thermoelectrics) 4.- Ceramics for energy storage in automotive applications (SOEC, batteries) 5.- Structural ceramic technology for reduced emissions (IC engines and hybrid vehicles)

	6.- Functional ceramic technology for reduced emissions (sensing, catalysis, actuation) 7. Polymer electrolyte membrane fuel cells (PEFCs) for automotive applications 8. Ionomer materials for PEFCs 9. Platinum Electrocatalysis in PEFCs 10. Non-precious Electrocatalysis for PEFCs 11. Hydrogen storage materials for PEFC applications 12.- Supply and use pathways of gasoline and diesel oil 13.- Supply and use pathways of hydrogen and bio fuel 14.- Supply and use pathways of electricity 15.- Exam: short report
Keywords キーワード	Toyota production system. Navigation system and GPS. Public transportation. Intelligent transportation systems. Emissions reduction. Alternative energy. Materials science. Fuel cells. Hydrogen.
Method of Instruction 授業の進め方	Lecture style classes. Debate. Written examinations.
Text and References 教科書及び参考図書	Will be given during class.
Office Hours 学習相談	Kenshi Itaoka Office: I2CNER 413 From 15:00 to 17:00 Wednesday, Thursday Email: k.itaoka@i2cner.kyushu-u.ac.jp Phone: 092-802-6729 Stephen Lyth Office: I2CNER 430 From 10:00 to 18:00 Thursday and Friday Email: lyth@i2cner.kyushu-u.ac.jp Nicola Perry Office: I2CNER 423 From 16:00 to 18:00 Thursday and Friday Email: perry@i2cner.kyushu-u.ac.jp
Grading 試験・成績評価の方法	.Final examination: 15% = Evaluation of programs.
Notes その他	Attendance to class is compulsory.

Course Title 授業科目名	Automotive Advanced Science
Course Category 授業科目区分	Basic Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	Introduction of automotive advanced technology relating to carbon-neutral energy research
Course Type and Schedule 授業方法及び開講学期	Lecture style with practices. Spring semester. Tuesday, the 3rd period (13:00-14:30)
Use language 使用言語	English
Credits 単位数	2 / Required course
Instructor 担当教員名	Ikuo Taniguchi, Masa-aki Sadakiyo, Motonori Watanabe
Prerequisite 履修条件	
Course Outline 授業の概要	This course introduces an imperious necessity of paradigm shift in energy based on from fossil resources to hydrogen.
General Course Objectives 全体の教育目標	The students shall learn the sciences and technologies required for establishment of a hydrogen-based society and efficient CO_2 capture and storage, which is especially important from a viewpoint of automotive science.
Specific Course Objectives 個別の学習目標	The student shall learn current problems relating to energy and basic sciences of hydrogen production, effective energy conversion, and CO_2 capture.
Course Plan 授業計画	1.- Introduction to carbon-neutral society. 2.- Brief introduction to CO_2 Capture & Storage. 3.- CO_2 capture technologies. 4.- Basic theory of membrane separation. 5.- Advanced CO_2 capture by membrane separation. 6.- Introduction of fuel cells. 7.- Solid-state proton-conducting materials. 8.- Introduction of catalysis. 9.- Catalysts for fuel cells. 10.- Porous materials. 11.- Introduction of photocatalyst 12.- Basic theory, and type of photocatalyst

	13.- Hydrogen production from catalyst 14.- CO_2 conversion from catalyst 15.- Advanced materials for catalyst and summary
Keywords キーワード	Carbon-neutral, hydrogen, carbon dioxide
Method of Instruction 授業の進め方	Lecture style classes and a few assignments.
Text and References 教科書及び参考図書	
Office Hours 学習相談	Office: I^2CNER Build. 1, Rm. 317 From 9:00 to 18:00 hrs Email: ikuot@i2cner.kyushu-u.ac.jp Phone: 092-802-6712
Grading 試験・成績評価の方法	Attendance: 50%. Assignment: 50%.
Notes その他	Attendance to class is compulsory.

Course Title 授業科目名	Functional Inorganic Materials
Course Category 授業科目区分	Advanced Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	Crystal Structure and Property of Inorganic Materials
Course Type and Schedule 授業方法及び開講学期	Lecture style and Autumn Semester of year 3
Use language 使用言語	English
Credits 単位数	2 /Elective
Instructor 担当教員名	Tatsumi Ishihara(2868, ishihara@cstf.kyushu-u.ac.jp)
Prerequisite 履修条件	
Course Outline 授業の概要	In this study, crystal structure and functional property of various inorganic materials will be explained.
General Course Objectives 全体の教育目標	Understanding the crystal structure of inorganic materials and its relationship between various property.
Specific Course Objectives 個別の学習目標	Understanding the reason why inorganic materials show various property. For this purpose, in first half of this lecture, details of crystal structure is understood from ionic size and coordination number. In second half, case study of material property is understood from structure and composition.
Course Plan 授業計画	1)Introduction 2)Bond nature of inorganic materials 3)Crystal Structure 4)Surface energy and sintering 5)Typical function of inorganic materials 6)Dielectric and Piezoelectric property(1) 7) Dielectric and Piezoelectric property(2) 8)Semiconducting property(1) 9) Semiconducting property(2) 10)Dopant and Valence number 11)Ionic Conductivity 12)Battery and Fuel Cells 13)Optic property and electric band structure 14)Mechanical property 15)Examination

Keywords キーワード	Inorganic Materials, Crystal Structure, Dielectric, Semiconductor, Magnetic, Ionic conductor, Optic property
Method of Instruction 授業の進め方	Teach and Discuss
Text and References 教科書及び参考図書	
Office Hours 学習相談	9:30-17:30
Grading 試験・成績評価の方法	Examination
Notes その他	

Course Title 授業科目名	Polymer Physical Chemistry
Course Category 授業科目区分	Advanced Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 /Elective
Instructor 担当教員名	Keiji Tanaka
Prerequisite 履修条件	
Course Outline 授業の概要	高分子固体の物性を階層的分子鎖熱運動性、力学物性、動的緩和測定、薄膜ダイナミクス、界面ダイナミクス、という観点から学習する。以下の内容について講義と演習を行う。１）イントロダクション、２）階層的分子運動、３）力学特性、４）動的力学緩和測定、５）薄膜ダイナミクス、６）界面ダイナミクス This class aims at understanding hierarchical Molecular Motion, mechanical properties, dynamic mechanical analysis, polymer dynamics in thin films, interfacial surface dynamics, and interfacial dynamics. The course schedule is as follows: 1) Introduction (1 lecture), 2) Hierarchical Molecular Motion (2 lectures) , 3) Mechanical Properties (1 or 2 lectures), 4) Dynamic Mechanical Analysis (2 or 3 lectures), 5) Polymer Dynamics in Thin Films (1-3 lectures), and 6) Interfacial Dynamics (1-3 lectures).
General Course Objectives 全体の教育目標	
Specific Course Objectives 個別の学習目標	

Course Plan 授業計画	
Keywords キーワード	
Method of Instruction 授業の進め方	
Text and References 教科書及び参考図書	
Office Hours 学習相談	
Grading 試験・成績評価の方法	
Notes その他	

Course Title 授業科目名	Applied Fluid Dynamics
Course Category 授業科目区分	Advanced Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	
Use language 使用言語	English
Credits 単位数	2 /Elective
Instructor 担当教員名	Dynamics Field faculty
Prerequisite 履修条件	
Course Outline 授業の概要	工学的に重要な乱流・乱流伝熱現象の数値計算を行う際に必要となる各種モデリング技術について, 導出概念や利用方法を理解するとともに, 将来新たな技術を開発するための基礎知識を修得することを目的とする。 This study aims to understand basic concepts of turbulence and turbulent heat transfer modeling that are necessary in CFD of engineering importance and also to take fundamental knowledge for further development of this field.
General Course Objectives 全体の教育目標	
Specific Course Objectives 個別の学習目標	
Course Plan 授業計画	
Keywords キーワード	

Method of Instruction 授業の進め方	
Text and References 教科書及び参考図書	
Office Hours 学習相談	
Grading 試験・成績評価の方法	
Notes その他	

Course Title 授業科目名	Environmental Economics
Course Category 授業科目区分	Advanced Subjects
Intended School 対象学府等	Graduate School of Integrated Frontier Sciences, Department of Automotive Science
Students Admitted 授業対象学生	International Master's Program Master first grade/second grade
Course Code 授業科目コード	
Course Description 講義題目	
Course Type and Schedule 授業方法及び開講学期	Regular lectures, Autumn Semester, Tuesday, First Period
Use language 使用言語	English
Credits 単位数	2 /Elective
Instructor 担当教員名	Toshiyuki Fujita (092-642-4448, tfujita@en.kyushu-u.ac.jp)
Prerequisite 履修条件	Knowledge of microeconomics and calculus
Course Outline 授業の概要	This course explains the ideas and the analytical tools of basic environmental economics. Environmental economics is a field of economics concerned with environmental issues. Environment is now a scarce resource, but since there is no market where it is traded at some prices, it can be used free of charge, causing the excessive use of environment. It is necessary for the government to implement some policies to give people the incentives for environmental protection.
General Course Objectives 全体の教育目標	Students will gain understanding in basic environmental economics.
Specific Course Objectives 個別の学習目標	Students will gain understanding in: 1. Introduction 2. Economics of sustainable development 3. Market failure 4. Incentive design 5. Pollution taxes and tradable emission permits 6. Transboundary pollution and global public goods 7. Theory and methods for environmental valuation.
Course Plan 授業計画	10/2 Guidance 10/9 Introduction (Chap. 1) 10/16, 10/23 Economics of sustainable development (Chap. 2) 10/30, 11/6 Market failure (Chap. 3) 11/13, 11/20 Incentive design (Chap. 4) 11/27, 12/4 Pollution taxes and tradable emission permits (Chap. 5)

	12/11, 12/18 Transboundary pollution and global public goods (Chap. 6) 1/8, 1/22 Theory and methods for environmental valuation (Chap. 11) 1/29 Examination
Keywords キーワード	Externalities, Public goods, Environmental policy, Pigovian tax, Emissions trading, Environmental valuation
Method of Instruction 授業の進め方	Lecture is given according to the textbook. Instructor will distribute necessary parts of the textbook, so students do not need to buy it.
Text and References 教科書及び参考図書	Textbook: Hanley, N., J. Shogren and B. White (2007), Environmental Economics: In Theory & Practice, Palgrave Macmillan, 2nd Edition.
Office Hours 学習相談	By Appointment (send an e-mail to instructor) Office: Room 301, Economics building, Hakozaki Campus
Grading 試験・成績評価の方法	Assignments 40% Final Examination 40% Attendance 20%
Notes その他	