

2025 年度シラバス

科目分類/Subject Categories			
学部等/Faculty	/大学院工芸科学研究科（博士前期課程）： /Graduate School of Science and Technology (Master's Programs)	今年度開講/Availability	/有：/Available
学域等/Field	/物質・材料科学域：/Academic Field of Materials Science	年次/Year	/1～2年次：/1st through 2nd Year
課程等/Program	/機能物質化学専攻：/Master's Program of Functional Chemistry	学期/Semester	/秋学期：/Fall term
分類/Category	/授業科目：/Courses	曜日時限/Day & Period	/：/

科目情報/Course Information				
時間割番号 /Timetable Number				
科目番号 /Course Number	61960022			
単位数/Credits	2			
授業形態 /Course Type	講義：Lecture			
クラス/Class				
授業科目名 /Course Title	Nano-Biomaterials and Laboratory：Nano-Biomaterials and Laboratory			
担当教員名 / Instructor(s)	/機能物質化学専攻関係教員：Related teacher of the Master's Program of Functional Chemistry			
その他/Other	インターンシップ実施科目 Internship	国際科学技術コース提供科目 IGP	PBL 実施科目 Project Based Learning	DX 活用科目 ICT Usage in Learning
	実務経験のある教員による科目 Practical Teacher			
科目ナンバリング /Numbering Code				

授業の目的・概要 Objectives and Outline of the Course	
日	
英	<p>The course will provide the basic knowledge and tools for designing, engineering and optimizing nanostructures and smart materials, mainly applied in the biomedical field.</p> <p>At the end of the course the student is expected to master the basic principle of designing, engineering and optimization of nanostructures and to screen the best device/technique for the related each application.</p>

学習の到達目標 Learning Objectives	
日	
英	<p>know the basic knowledge and tools for designing, engineering and optimizing nanostructures and smart materials</p> <p>master the basic principle of designing, engineering and optimization of nanostructures and to screen the best device/technique</p>

学習目標の達成度の評価基準 / Fulfillment of Course Goals (JABEE 関連科目のみ)	
日	
英	

授業計画項目 Course Plan		
No.	項目 Topics	内容 Content

1	日 英	Introduction to bionanotechnology	Introduction to bionanotechnology
2	日 英	Biosensors and surface functionalization	Biosensors and surface functionalization
3	日 英	Bioimaging	Bioimaging
4	日 英	Drug delivery and theranostics	Drug delivery and theranostics
5	日 英	Rigenerative medicine	Rigenerative medicine
6	日 英	3D printing	3D printing
7	日 英	Non-medical field of applications	Non-medical field of applications
8	日 英	The Lab section (1)	Lecture on regulatory affairs of bionanomaterials, from PHASE 1 to the market
9	日 英	The Lab section (2)	Virtual Lab, from NPs synthesis to in vivo imaging (JOVE and recorded videos)
10	日 英	The Lab section (3)	Movie on Ethic, they grey zones of data
11	日 英	The Lab section (4)	Case Study presentations from students (10 min each on a specific application of bionanomaterials)
12	日 英	The Lab section (5)	Visit of Nanomnia Start-up, Lab experiments and lectures
13	日 英	Presentation and discussion (1)	Oral power point presentation on a case study
14	日 英	Presentation and discussion (2)	Oral power point presentation on a case study
15	日 英	Examination	Written examination

履修条件 Prerequisite(s)

日	
英	

授業時間外学習（予習・復習等）

Required study time, Preparation and review

日	
英	Biomolecular technology Chemistry of bionanomaterials and lab

教科書／参考書 Textbooks/Reference Books

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英	Nanobiotechnology: Bioinspired Devices and Materials of the Future, ISBN-10 : 1617378305, Humana Pr Inc., 2010
	Nanomedicine and Nanobiotechnology di Stergios Logothetidis, ISBN-10 : 3642432662, Springer 2014

成績評価の方法及び基準 Grading Policy	
日	
英	Written examination Oral power point presentation on a case study

留意事項等 Point to consider	
日	
英	