2026 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	/材料制御化学専攻 ：/Master's Program of Material's Properties Control	学期/Semester	/春学期 ：/Spring 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	61760020			
単位数/Credits	2			
授業形態 /Course Type	講義・演習・実験 ：Lecture/Practicum/Lab			
クラス/Class				
授業科目名 /Course Title	Technology of Polymeric Materials : Technology of Polymeric Materials			
担当教員名 / Instructor(s)	/トリノ工科大学教員（材料創製化学専攻および材料制御化学専攻ダブル・ディグリープログラムコース）：Related teacher of Polytechnic University of Turin (Double Degree Program course in the Master's Program of Innovative Materials and Material's Properties Control)			
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	The Course is related to the study of thermoplastic polymeric materials processing with a specific part on design. In the second part specific attention will be focused on technologies such as fillers for polymeric materials, polymeric blends, rubber technology, foams, paints, coating and adhesives. Finally will be presented the fundamentals for selection of polymeric materials and design of plastic objects. During the course all the aspects of polymer technologies will be studied, taking into account the problems related to industrial scale-up of the processing. Particularly the processing techniques to form plastic objects will be known. Moreover it will be know the main polymer technologies as blends, rubber, foams, coating and adhesives.

学習の到達目標 Learning Objectives	
日	To understand thermoplastic polymeric materials processing with a specific part on design
英	To understand thermoplastic polymeric materials processing with a specific part on design

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	Presentation(1)	
	英	Processing techniques(1)	Viscoelasticity, polymer melt rheology.
2	日	Presentation(2)	
	英	Processing techniques(2)	Rheometry.
3	日		
	英	Processing techniques(3)	Rheological features of polymers vs. processing.
4	日		
	英	Processing techniques(4)	Thermoplastic polymer technologies.
5	日		.
	英	Processing techniques(5)	Processing techniques(5)
6	日		
	英	Processing techniques(6)	Injection molding, films, pipes extrusion.
7	日		
	英	Processing techniques(7)	Blow molding, rotomolding and thermoforming.
8	日		
	英	Processing techniques(8)	Post-processing techniques.
9	日		
	英	Polymer technologies(2)	Additives, reinforcing agents and fillers in polymers.
10	日		
	英	Polymer technologies(2)	Polymeric blends, Rubber technology.
11	日		
	英	Polymer technologies(3)	Expanded polymers and their technologies.
12	日		
	英	Polymer technologies(4)	Polymer coatings.
13	日		
	英	Polymer technologies(5)	Adhesive and sealing systems.
14	日		
	英	Presentation(1)	Presentations of group exercised and laboratories in this course.
15	日		
	英	Presentation(2)	Presentations of group exercised and laboratories in this course.

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	Laboratories on rheological characterization of molten polymers and on thermoplastic polymers processing (compounding, extrusion, injection molding) and morphological characterization of filled materials. The laboratories will be carried out at the Alessandria branch of Politecnico and for the students the travels will be arranged by bus.

教科書／参考書 Textbooks/Reference Books	
日	
英	D.H. Morton-Jones, Fabbricazione di componenti in materiali polimerici; A.M. De Filippi, Scienza e tecnologia dei Materiali Polimerici; S. Bruckner, G. Allegra, M. Pegoraro, F.P. La Mantia. Polymer Science & Technology, second edition Joel R. Fried – Prentice Hall PTR Manuale delle Materie Plastiche 10° edizione, Hansjurgen Saechtling – Ed. Tecniche nuove Manuale dello stampaggio progettato, Giorgio Bertacchi – Ed. Tecniche nuove Polymer Processing, Principles and Design, D.G. Baird, D.I. Collias – Ed. Wiley Processing di Materiale Polimerici - Scuola AIM - Diderotiana Editrice La «Plastica» Conoscerla per apprezzarla, G. Locati, A. Fiocca – Ed Regione Piemonte Plastics Reinforcement and Industrial Applications, T.R. Crompton CRC Press Taylor & Francis Group; August 25, 2015 Filled Polymers: Science and Industrial Applications, Jean L. Leblanc

	CRC Press Taylor & Francis Group; October 14, 2009 Industrial Polymers, Specialty Polymers, and Their Applications, ManasChanda, SalilK. Roy CRC Press Taylor & Francis Group; July 18, 2008

成績評価の方法及び基準 Grading Policy	
日	
英	Written test; There will three written parts for the final exam on: 1. Plastics processing and Lab experiences (60 minutes) with 10 multiple choice questions (0,5pt) and 5 open question (2pt.) total rating (15pt.) 2. Technologies for plastics (40 minutes) with 8 multiple choice questions (0,5pt) and 3 open question (2pt.) total rating (10pt.) 3. Plastic objects design (30 minutes) total rating (5pt.) During the parts 1 and 2 of the exam it is not possible to use books and slides. Final Mark: The final mark will be calculated by the sum of the marks obtained in the three examinations. An additional point will be reserved for the clarity of open questions to obtain the laude.

留意事項等 Point to consider	
日	
英	