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	/独立専攻：/Fibro/BBM	年次/Year	/１～２年次：/1st through 2nd Year
課程等/Program	/先端ファイブロ科学専攻：/Master's Program of Advanced Fibro-Science	学期/Semester	/秋学期：/Fall term
分類/Category	/授業科目：/Courses	曜日時限/Day & Period	/集中：/Intensive

科目情報/Course Information				
時間割番号 /Timetable Number	65119918			
科目番号 /Course Number	65160217			
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	先端テキスタイル加工-機械：Advanced and Specialized Textile Processing - Mechanical			
担当教員名 / Instructor(s)	/石井　佑弥/(Carmen Visconte) : ISHII Yuya/Carmen Visconte			
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	M_AF6121			

授業の目的・概要 Objectives and Outline of the Course	
日	Keywords: weaving, air-jet looms, pneumatic systems. Final competences: 1 Understanding of shuttleless weaving procedures. 2 Deepen the knowledge in the field of fluid systems and pneumatic automation.
英	Keywords: weaving, air-jet looms, pneumatic systems. Final competences: 1 Understanding of shuttleless weaving procedures. 2 Deepen the knowledge in the field of fluid systems and pneumatic automation.

学習の到達目標 Learning Objectives	
日	• understanding of various aspects related to spinning including latest developments 1 • understanding of weaving proced be able to understand the operation of basic pneumatic phenomena, to design pneumatic 1 • basic circuits
英	• understanding of various aspects related to spinning including latest developments 1 • understanding of weaving procedures, weaving processes, manufacturing 1 • deepen the knowledge in the field of pneumatic systems, pneumatic automation circuits be able to understand the operation of basic pneumatic phenomena, to design pneumatic 1 • basic circuits

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	Introduction on fluid characteristics	Some characteristics of fluids: density, ideal gas law, viscosity, compression and expansion of fluids. Fluid statics: pressure at a point, gauge and absolute pressure. Elementary fluid dynamics: the energy equation.
	英	Introduction on fluid characteristics	Some characteristics of fluids: density, ideal gas law, viscosity, compression and expansion of fluids. Fluid statics: pressure at a point, gauge and absolute pressure. Elementary fluid dynamics: the energy equation.
2	日	Fluid in motion	Elementary fluid dynamics: the energy equation, the Bernoulli equation, conservation of mass-the continuity equation. Viscous flow in pipes: laminar or turbulent flow; major and minor losses.
	英	Fluid in motion	Elementary fluid dynamics: the energy equation, the Bernoulli equation, conservation of mass-the continuity equation. Viscous flow in pipes: laminar or turbulent flow; major and minor losses.
3	日	Measuring instruments	Fluid pressure, flow-rate and velocity measurement.
	英	Measuring instruments	Fluid pressure, flow-rate and velocity measurement.
4	日	Nozzles and free jets	Nozzles: subsonic and sonic flow; flow rate characteristics; standardized test bench for flow-rate measurement. Free jets: laminar and turbulent jets, structure of jets, jet spreading.
	英	Nozzles and free jets	Nozzles: subsonic and sonic flow; flow rate characteristics; standardized test bench for flow-rate measurement. Free jets: laminar and turbulent jets, structure of jets, jet spreading.
5	日	Weaving	Overview on the weaving process. Weft insertion technique in air-jet looms: main nozzle, auxiliary nozzles, profiled reed. Examples of experimental and numerical characterization of these components. Air jets/yarn interaction: drag and lift forces.
	英	Weaving	Weaving
6	日	Pneumatic technology 1	Compressed air production and treatment. Pressure regulation.
	英	Pneumatic technology 1	Compressed air production and treatment. Pressure regulation.
7	日	Pneumatic technology 2	Automatic circuits: structure, requirements, kind of actuation. Pneumatic actuators: simple and double acting cylinders; air-cushioning device.
	英	Pneumatic technology 2	Automatic circuits: structure, requirements, kind of actuation. Pneumatic actuators: simple and double acting cylinders; air-cushioning device.
8	日	Pneumatic technology 2: practice	Evaluation of force and air-consumption of single and double acting actuators.
	英	Pneumatic technology 2: practice	Evaluation of force and air-consumption of single and double acting actuators.
9	日	Pneumatic technology 3	Pneumatic and electropneumatic valves: spool and poppet valves; directional control valves; check, choke, double cut-off, shuttle valves. Flow rate characteristics.
	英	Pneumatic technology 3	Pneumatic and electropneumatic valves: spool and poppet valves; directional control valves; check, choke, double cut-off, shuttle valves. Flow rate characteristics.
10	日	Pneumatic technology 4	Basic pneumatic circuits. Direct and indirect actuation. Actuators' speed control. Stroke-end sensors.
	英	Pneumatic technology 4	Basic pneumatic circuits. Direct and indirect actuation. Actuators' speed control. Stroke-end sensors.
11	日	Pneumatic technology 4: practice	Design of simple manually actuated pneumatic circuits.
	英	Pneumatic technology 4: practice	Design of simple manually actuated pneumatic circuits.
12	日	Pneumatic technology 4: practice	Design of simple automatic pneumatic circuits.
	英	Pneumatic technology 4:	Design of simple automatic pneumatic circuits.

		practice	
13	日	Driving circuit of an air-jet main nozzle	Pneumatic circuit for weft yarn insertion: optimisation and insertion rates, mod
	英	Driving circuit of an air-jet main nozzle	Pneumatic circuit for weft yarn insertion: optimisation and insertion rates, models and simulation.
14	日	Spinning 1	The methodology of spinning 1.
	英	Spinning 1	The methodology of spinning 1.
15	日	Spinning 2	The methodology of spinning 2.
	英	Spinning 2	The methodology of spinning 2.

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	Initial competences: Bsc level in mathematics, physics, general process engineering.
英	Initial competences: Bsc level in mathematics, physics, general process engineering.

教科書／参考書 Textbooks/Reference Books	
日	Handouts are provided by the instructor.
英	Handouts are provided by the instructor.

成績評価の方法及び基準 Grading Policy	
日	End-of-term evaluation Examination methods during the first examination period: Written Examination Examination methods during the second examination period: Written Examination During examination period: written closed-book exam Calculation of the ex
英	End-of-term evaluation Examination methods during the first examination period: Written Examination Examination methods during the second examination period: Written Examination During examination period: written closed-book exam Calculation of the ex

留意事項等 Point to consider	
日	Teaching language is English. Intensive course
英	Teaching language is English. Intensive course