



Recp 1/2021

Prot. 1090 del 7/01/2021

## AGREEMENT

Between Cranfield University and Università di Pisa

Cranfield University	Università di Pisa
Cranfield, Bedfordshire, UK MK43 0AL	Lungarno Pacinotti, 43, 56126 Pisa, ITALY
represented by the Vice-Chancellor - Professor Simon Pollard	represented by the Rector Professor Paolo Maria Mancarella
under: the University's Charter	under: the Statute of the Università di Pisa

Given

1. the existing relations between Università di Pisa and Cranfield University
2. the wish expressed by the authorities of both institutions to establish regular collaboration in the fields of mutual interest
3. the benefits such partnership will bring to the promotion of teaching and research and for the further training of professors, scientists, and students

### ARTICLE 1: PRINCIPLE

The parties resolve the setting up of a joint programme aimed at awarding a Double Degree: "Laurea Magistrale in Ingegneria Gestionale (Università di Pisa) – MSc Engineering and Management of Manufacturing Systems (School of Applied Sciences at Cranfield University)". The programme will be offered each year to a defined quota of selected students. The programme will award the double-degree qualification to students that have completed the first year of the Laurea Magistrale<sup>1</sup> in Ingegneria Gestionale at the Università di Pisa and the MSc Engineering and Management of Manufacturing Systems at Cranfield University, including the completion of the final MSc Project and Thesis. The Thesis will be recognised as equivalent to the Italian Tesi di Laurea. The final exam at Cranfield University will be followed by the final exam (Esame di Laurea) at the Università di Pisa, which will end the programme. The MSc qualification is formally awarded during the Graduation Ceremony at Cranfield University in June of the year following the completion of Phase 2 at Cranfield as well as the final examination in Pisa (Esame di Laurea).

### ARTICLE 2: SELECTION

Candidates will be accurately selected among the Università di Pisa's students that have completed the first of the two years of the Laurea Magistrale in Ingegneria Gestionale. Selection will be based on the duly completed application form and on selection tests and requirements the two institutions consider appropriate.

### ARTICLE 3: DURATION

The agreement's duration is four years, starting with the beginning of the Italian Academic Year following the date of last signature.

It may be renewed upon the two parties' mutual written consent unless one of the parties gives a two-year notice of termination. This period is required to allow all the selected students to complete their studies. In the event that this Agreement is terminated before its original date of expiry, both Parties will ensure that the enrolled students can complete their studies.

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<sup>1</sup> "Laurea Magistrale" is the Italian post-graduate 2-year programme that requires to have completed a 3-year programme "Laurea" (equivalent to a British BSc)



#### **ARTICLE 4: PROGRAMME CONTENTS**

The programme contents encompass one year- phases, as follows:

Phase 1 – For the first year of the Laurea Magistrale in Ingegneria Gestionale at the Università di Pisa, the programme contents are those in Annexe A-1

Phase 2 For the programme of the MSc Engineering and Management of Manufacturing Systems of the School of Applied Sciences at Cranfield, the programme contents are those in Annexe A-2.

The syllabuses of both institutions could be annually reviewed and renegotiated.

#### **ARTICLE 5: LANGUAGE**

The programme will be held in Italian during Phase 1 and in English during Phase 2.

#### **ARTICLE 6: TIMETABLE OF THE JOINT PROGRAMME**

Each academic year, Phase 1 will start late September and end in late September of the following year. Phase 2 will start the next October and end in September of the following calendar year.

#### **ARTICLE 7: PROGRAMME SITE - LIABILITY**

Phase 1 will be performed at the Department of Energy, Systems, Territory and Construction Engineering (Destec) of the Università di Pisa (Italy) under Università di Pisa internal regulations.

Phase 2 will be performed in the Cranfield University campus, Cranfield (UK), and Italian students will be considered as students of the School of Applied Sciences at Cranfield, under School of Applied Sciences internal regulations.

The Università di Pisa as students' enrolling institution in the Double Degree will assume their liability.

#### **ARTICLE 8: STUDENTS' SELECTION AT THE UNIVERSITA' DI PISA**

The Università di Pisa will be in charge of selecting a maximum of 4 of its students among candidates who have completed the first year of Laurea Magistrale in Ingegneria Gestionale and are recommended by Mr. Dimitri Thomopoulos or another contact person the board of the degree programme will appoint.

The following criteria will be assessed:

1. The average mark of the overall results of the first year of the Laurea Magistrale.
2. The candidates English language proficiency It is required: a minimum score of 92 in the TOEFL test, or 800 in TOEIC, or 6.5 in IELTS or Cambridge CAE or equivalent examination.

#### **ARTICLE 9: FINAL ASSESSMENT**

The credits obtained at Cranfield University will be recognised by the Università di Pisa.

The final assessment regulations will be those of the Università di Pisa for the Phase 1 and those of the School of Applied Sciences at Cranfield for the Phase 2.

Therefore, the Università di Pisa is entirely and exclusively responsible for the marks assigned during the first year of the joint programme and the School of Applied Sciences at Cranfield will be entirely and exclusively responsible for the marks assigned during the second year of the joint programme.

The final exam at Cranfield University will be followed by the final examination (Esame di Laurea) at the Università di Pisa. The Thesis will be written in English, but it will include a title and an abstract in Italian.



#### ARTICLE 10: ACADEMIC FAILURE

In the event of Academic failure at the end of Phase 2, the student will be excluded from the joint programme. The Università di Pisa will oversee all resolutions concerning the assessment of individual specific case and circumstance.

#### ARTICLE 11: DATE OF AWARDING OF THE DOUBLE DEGREE

The Laurea Magistrale degree at the Università di Pisa will be awarded each year in the September-October graduation session, upon the relevant assessment of the Cranfield School of Applied Sciences and following the completion of Phase 2 and the examination process of article 9.

The Double Degree qualification is awarded at the Graduation Ceremony at Cranfield University in the calendar year following the completion of Phase 2 and the final exam at the Università di Pisa (Discussione della Tesi). It will be the student's liability to provide both institutions with the Thesis documents, meeting their standard format requirements.

#### ARTICLE 12: REGISTRATION

Students admitted to the joint programme will pay the applicable registration fees as follows: for the first year the fee will be paid to Università di Pisa, for the second year the fee will be paid both to the University of Pisa and Cranfield University. Cranfield University will provide admitted students with guidance and support for applying to available scholarships to cover the costs of study at Cranfield University.

#### ARTICLE 13: STEERING COMMITTEE

The agreement's liability will be entrusted to the Presidente del Consiglio Aggregato in Ingegneria Gestionale at the Università di Pisa and MSc Engineering and Management of Manufacturing Systems Course Director of the School of Applied Sciences at Cranfield University.

The Programme Directors will constantly communicate to monitor the progress of the Double Degree programme, thus assuring the programme improvement

#### ARTICLE 14: AGREEMENT

Two copies of this agreement will be signed, one for each institution. Both may be used for reference purposes.

**ARTICLE 15: PARTIES RELATIONSHIP** This Agreement is signed by both parties given that it is a fair and honest statement of intentions and that it has no validity as a binding contract under Law in any legal system. Nothing in this Agreement could be construed as the setting of a legal partnership or joint venture. Neither of the Parties will represent itself as being an agent of the other and neither of the Parties is authorized to commit the other.

Signed on behalf of Cranfield University

Signed on behalf of Università di Pisa

  
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Professor Simon Pollard  
Vice-Chancellor  
Cranfield University

Professor Paolo Maria Mancarella  
Rettore  
Università di Pisa

Date: 26 November '20

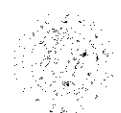
Date: 22/07/2020



UNIVERSITÀ DI PISA

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MODIFICATO



Ref 1 / 2024 MOT 1090 del 7/01/2024

## ANNEX A-1

### STRUCTURE AND CONTENTS OF THE FIRST YEAR AT THE "LAUREA MAGISTRALE IN INGEGNERIA GESTIONALE" (UNIVERSITA' DI PISA)

Exam	Aim and contents	Credits (Italian system)
Statistica II (Statistics II)	To provide students with knowledge, methods, interpretive skills, and programming ability with statistical software, for topics in computational statistics, such as the analysis of multivariate data and time series of interest in industrial engineer.	6
Ricerca Operativa II ( <i>Operational Research II</i> )	<i>Ability to develop advanced optimization models for real-world applications arising in the management of complex systems, such as industrial production and service logistics. Basic optimization software tools.</i>	6
Gestione integrata della produzione ( <i>Integrated manufacturing systems</i> )	To provide knowledge, methods and applications on modern integrated manufacturing systems, needed to carry out an efficient firm management. The following competences will be provided: 1) components of integrated manufacturing systems, 2) programming methods for the management of manufacturing systems, 3) basics of sizing and balancing of production lines, 4) examples of automated manufacturing processes	12
Strategie di business and management accounting ( <i>Business strategy and management accounting</i> )	General objectives of teaching are to understand the fundamental concepts (characteristics, feasibility, introduction issues) of management control systems, processes and techniques such as enablers of strategy implementation and dynamic re-definition.	9
Modellistica e simulazione dei processi di produzione discreti ( <i>Modeling and simulation of discrete manufacturing processes</i> )	- To model discrete manufacturing processes such as communication systems, traffic management systems, services management systems, event based dynamical systems; - To appropriately use simulation tools, - To use queue theory and Markov chain theory in order to model and solve various industrial issues and the associated decision making problems	6
<b>Curriculum Digital Product Innovation</b>		
Data Mining and Intelligent Systems ( <i>Data Mining and Intelligent Systems</i> )	The first part of the course (Data Mining) gives a good knowledge of the main techniques used in data preprocessing, data warehouse, frequent pattern mining, frequent sequential pattern mining, graph mining, classification, prediction, clustering and outlier detection. This knowledge will allow to manage different types of aspects concerning data mining problem and to identify the most suitable technique for solving it. <b>The second part of the course (Intelligent Systems) provides</b> knowledge about the basic concepts of nature-inspired computational techniques, such as artificial neural networks, fuzzy systems and genetic algorithms,	12



	and their application to a wide variety of application areas.	
9 credits to be selected among those approved by the degree course board		9
<b>Curriculum Fabbrica digitale - Smart Industry - Digital Operations</b>		
Supply Chain Management and e-business ( <i>Supply Chain Management and e-business</i> )	To provide knowledge and tools to design and manage the supply chain with particular reference to the strategic value of collaborative approaches and to sustainability.	9
Finanza per la supply chain ( <i>Supply Chain Finance</i> )	The objectives of the course are double folded. Firstly, provide students with the financial tools for taking decisions regarding equity, debts and the firm's financial structure. Secondly, allow students to achieve skills in the use of solutions (implemented by financial institutions or technology providers) for the alignment of financial flows with product and information flows within the supply chain, in order to improve cash flow management from a supply chain perspective	6
6 credits to be selected among those approved by the degree course board		6

## ANNEX A-2

### STRUCTURE AND CONTENTS OF THE SECOND YEAR AT CRANFIELD UNIVERSITY – MSc Engineering Management of Manufacturing Systems (School of Applied Sciences)

Exam	Aim and contents	Credits (UK system)	Credits (Italian system)
Operations Management	An introduction to manufacturing and service activities. Capacity, demand and load; identifying key capacity determinant; order-size mix problem; coping with changes in demand. Standard times, and how to calculate them; process analysis and supporting tools; process simplification. What quality is; standards and frameworks; quality tools; quality in the supply chain. Scheduling rules; scheduling and nested set-ups. Roles of inventory; dependent and independent demand; Economic Order Quantity; uncertain demand; inventory management systems and measures	10	3



	<p>Information systems – at operational, managerial, and strategic levels; bills of material; MRP, MPRII and ERP systems</p> <p>Ohno's 7 wastes; Just-in-Time systems (including the Toyota Production System, and Kanbans).</p>		
Enterprise Systems	<p>Introduction to business functions, processes and data requirements within an enterprise.</p> <p>Enterprise wide IT systems. Managing Enterprise through ERP.</p> <p>Enterprise Resource Planning (ERP): concepts, techniques and tools.</p> <p>ERP selection and implementation issues.</p> <p>An Introduction to IoT and Cyber Security.</p> <p>SAP based hands-on case studies.</p> <p>Conduct a Group Presentation on the Impact of ERP on a specialist MSc theme.</p>	10	3
Operations Analysis	<p>Six Sigma, Process capability, common and special cause variability, control charts, acceptance sampling.</p> <p>Analysis of systems to produce simple models. IDEF0 and IDEF3 and their application. Business process fundamentals and the process review. Improvement procedures, modelling methods and process models.</p> <p>Performance measurement. Responding to and improving reliability.</p>	10	3
General Management	<p>Management Accounting Principles and Systems;</p> <p>Personal style and team contribution, interpersonal dynamics, leadership, human and cultural diversity;</p> <p>Project Management: structure and tools for project management</p> <p>Introduction to standards: awareness of standards, relevant standards (quality, environment and H&amp;S), value of using standards, management of the standard and audit.</p>	10	3
Manufacturing Systems Engineering	<p>Design of layouts. Human centred factory design.</p> <p>Group Technology &amp; Cellular manufacturing.</p> <p>Different approaches to factory layout such as process and product layouts. Reasons for choice of cellular manufacturing and benefits. Manufacturing Systems modelling using discrete-event simulation.</p> <p>Analysis of manufacturing systems using simulation.</p>	10	3
Internet of Things	<p>IoT Concepts &amp; Introduction to IoT. IoT-enabled innovation in products and services. Introduction to IoT project activity. Industry 4.0 technologies and Industrial Internet of things (IIoT). IoT sensing.</p>	10	3



	Introduction to IoT architectures and platforms. Creating and working with IoT data flows. IoT-enabled data value chains. IoT-driven data analytics (edge and cloud analytics). From data to IoT-enabled products, applications and services. Cloud services, interfaces, dashboards. Overview of IoT standards. IoT Challenges (scalability, interoperability, security, privacy). IoT-enabled business ecosystems and business models.		
Supply Chain Management	Competitive manufacturing strategy concepts. Benchmarking of manufacturing system performance. Manufacturing strategy in business success. Strategy formation and formulation, leading on to system design. Structured strategy formulation and system design methodologies. Approaches to strategy formulation in differing business contexts. Realisation of new strategies/system designs, including approaches to implementation. Case study on design of competitive manufacturing strategy.	10	3
Manufacturing Strategy	Competitive manufacturing strategy concepts. Benchmarking of manufacturing system performance. Manufacturing strategy in business success. Strategy formation and formulation, leading on to system design. Structured strategy formulation and system design methodologies. Approaches to strategy formulation in differing business contexts. Realisation of new strategies/system designs, including approaches to implementation. Case study on design of competitive manufacturing strategy.	10	3
Group project	Applying taught material to a real current problem; working with an organisation and its staff (in some cases); developing interpersonal and group-working skills. Each project will be supervised by a member/s of academic staff and you will be expected to hold regular group meetings. At the end of the project each student is expected to write a report and there will also be an oral presentation of your work.	40	12
Individual thesis project	The individual thesis tests the ability of the student: (a) to define the project by reference to the scientific, technical and/or commercial literature, to undertake a critical appraisal of such literature and to provide a justification for the research. (b) to plan and manage the research	80	24





	<p>programme.</p> <p>(c) to define the work to be carried out and to report the results in a clear manner.</p> <p>(d) to analyse the work, relate it to the work of others where appropriate and to be self critical.</p> <p>(e) to communicate the work, its results and analysis in a technical document.</p>		
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