



PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 40th cycle

THEMATIC Research Field: DE-REMANUFACTURING SYSTEMS

Monthly net income of PhDscholarship (max 36 months)
€ 1500.0
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
<p>Motivation and objectives of the research in this field</p>	<p>Circular economy has become one of the key strategic priority of the European Union. In order to introduce circular economy in manufacturing one of the key problem is to regain or even upgrade the functions of the product after a round of use of the product has been completed. Therefore, De-remanufacturing plant need to be created in Europe entailing a deep change in the European manufacturing industry. There is the need to be able to design and manage de-remanufacturing facilities which are different from classical facilities since the quality of incoming cores is normally not completely known. As a result, very flexible and reconfigurable systems have to be designed and managed in presence of uncertain input in quality, quantity, time of availability.</p>
<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>Methods to manage de-remanufacturing systems call for the ability to devise on the fly programs to run the whole system and the single devices. This has to be done on the basis of the results on the inspection of the incoming cores, therefore products can be considered one of a kind even if they have to be produced in high volumes. This calls for new models to program flexible devices in order to take advantage of flexibility. AI can also be investigated by using methodologies and tools that guarantee the safety of the operations. At design levels the need of flexibility and reconfigurability must be carefully planned while taking into account the stochasticity in terms on quality, quantity, time of availability using models based on stochastic programming and dynamic stochastic</p>



	programming.
Educational objectives	The goal is to prepare a PhD able to deal with the complex problems connected with the planning of de-manufacturing facilities who is knowledgeable of the techniques which can be adopted and is aware of the real problems related to particular classes of product with particular reference to electric vehicles. The ability to understand and cope with completely new disruptive scenarios of manufacturing which departs from the classical theory is a distinctive feature of the formed figure.
Job opportunities	Introducing de-manufacturing in Europe calls for a complete modification of the European manufacturing base. Therefore, there is at industrial and academic level the urgent need of scientist able to understand the new situation, model it and introduce new methodologies and tool to address it. It can be envisaged that due the pervasiveness of circular economy there will be a dramatic lack of experts able to deal with the new situation both at industrial and academic level. List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research include: Karlsruhe Institute of Technology (KIT), University of Aachen (RWTH)
Composition of the research group	2 Full Professors 1 Associated Professors 1 Assistant Professors 5 PhD Students
Name of the research directors	Prof. Tullio Tolio

Contacts	
For questions about scholarship/support please contact phd-dmec@polimi.it	

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--



Housing - Out-of-town residents (more than 80Km out of Milano)	--
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Scholarship Increase for a period abroad	
Amount monthly	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>Financial aid is available for all PhD candidates (purchase of study books and materials, funding for participation in courses, summer schools, workshops and conferences) for a total amount of euro 6.114,50.</p> <p>Our candidates are strongly encouraged to spend a research period abroad, joining high-level research groups in the specific PhD research topic, selected in agreement with the Supervisor. An increase in the scholarship will be applied for periods up to 6 months (approx. 750 euro/month- net amount).</p> <p>Teaching assistantship: availability of funding in recognition of supporting teaching activities by the PhD candidate. There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.</p>