

Discussing Modernizing Engineering Education through the Erasmus + Project Titled "Open Educational Resources on Enabling Technologies in Wearable and Collaborative Robotics (WeCoRD)"

**Ebru Kilic-Bebek¹, Kostas Nizamis², Zeynep Karapars³, Ali Gokkurt⁴, Ramazan Unal⁵,
Ozkan Bebek⁶, Mark Vlutters⁷, Emmanuel Vander Poorten⁸, Gianni Borghesan⁹, Wilm
Decré¹⁰, Erwin Aertbelien¹¹, Olga Borisova¹², Ivan Borisov¹³, Sergey Kolyubin¹⁴, Melike
İrem Kodal¹⁵, Barkan Ugurlu¹⁶**

¹Ozyegin University, Sectoral Education Program, ebru.kilicbebek@ozyegin.edu.tr, Istanbul, Turkey

²University of Twente, Department of Design, Production and Management, k.nizamis@utwente.nl, Enschede,
The Netherlands

³Ozyegin University, Faculty of Architecture and Design, zeynep.karapars@ozyegin.edu.tr, Istanbul, Turkey

⁴Ozyegin University, Faculty of Architecture and Design, ali.gokkurt@ozyegin.edu.tr, Istanbul, Turkey

⁵Ozyegin University, Department of Mechanical Engineering, ramazan.unal@ozyegin.edu.tr, Istanbul, Turkey

⁶Ozyegin University, Department of Mechanical Engineering, ozkan.bebek@ozyegin.edu.tr, Istanbul, Turkey

⁷University of Twente, Department of Biomechanical Engineering, m.vlutters@utwente.nl, Enschede, The
Netherlands

⁸KU Leuven, Department of Mechanical Engineering, emmanuel.vanderpoorten@kuleuven.be, Leuven,
Belgium

⁹Gianni Borghesan, KU Leuven, Department of Mechanical Engineering, gianni.borghesan@kuleuven.be,
Leuven, Belgium

¹⁰KU Leuven, Department of Mechanical Engineering, wilm.decre@kuleuven.be, Leuven, Belgium

¹¹KU Leuven, Department of Mechanical Engineering, erwin.aertbelien@kuleuven.be, Leuven, Belgium

¹²ITMO University, Department of Mechatronics, borisowa.o.v@yandex.ru, Saint Petersburg, Russia

¹³ITMO University, Department of Control Systems and Informatics, borisow.i.i@yandex.ru, Saint Petersburg,
Russia

¹⁴ITMO University, Faculty of Control Systems and Robotics, s.kolyubin@itmo.ru, Saint Petersburg, Russia

¹⁵Senior Manufacturing Quality Engineer, Ford Otosan

¹⁶ Ozyegin University, Department of Mechanical Engineering, barkan.ugurlu@ozyegin.edu.tr, Istanbul, Turkey

Abstract

The Erasmus + project titled “Open Educational Resources on Enabling Technologies in Wearable and Collaborative Robotics (WeCoRD)”, can serve as a model to establish strategic international and multidisciplinary partnerships to modernize engineering education. WeCoRD project is a collaboration among internationally renowned institutions from Turkey, Belgium, Russia, and the Netherlands to create an innovative course on wearable and collaborative robotics with Open Educational Resources (OERs) and an online Virtual Lab aimed at accessibility across Europe. This collaboration involves many fields from engineering, health and design disciplines as well as an industry partner from the automotive manufacturing sector. The main objectives of the project are to: (1) prepare a graduate level course in wearable and collaborative robotics, (2) enhance EU higher education capacity in the field with clear use-case scenarios from the industry and medical applications, (3) provide open-source materials including a virtual lab, and (4) fill the skill gap between the industry and the academia while also aiming a continued professional development. With these goals which aim to modernize

engineering education and make it more relevant to industry, the WeCoRD project brings both multidisciplinary and interdisciplinary aspects of robotics education to a new level. Each intellectual output (IO) of the project is allocated to a project partner based on their expertise. The course module design and development is planned as follows: The IO1 (the first course module) on “Components for wearable and collaborative robots” is led by Ozyegin University, Turkey; the IO2 (the second course module) on “Modeling, design and control of wearable and collaborative robots as systems” is led by ITMO, Russia; the IO3 (the third course module) on “Human-robot interaction for wearable and collaborative robots” is led by KU Leuven, Belgium; the IO4 (the fourth course module) on “Medical applications” is led by U.Twente; the IO5 (integration of the first three course modules into one course) on the graduate level course to be integrated into graduate degree programs and to be adopted for continued professional development (CPD) training programs, as well as the translation of the course materials into Turkish is led by KU Leuven, Belgium; the IO6 on the “Virtual Lab” is led by ITMO, Russia; and finally IO7 on the “Video Collection” is led by Ozyegin University, Turkey. FORD-Otosan, which is one of the industry partners from Turkey will host students, provide site visits and offer workshops. Each project partner and their contributions will be addressing the fundamental need for modernizing engineering education through students’ active participation and boosting students’ skill development. In addition to a multidisciplinary and interdisciplinary exposure, students will get a chance to work with industry partners and learn through authentic problem solving and relevant feedback. Providing a deeper and more effective learning experience will be among the core design principles of the course modules, labs, videos and industry collaborations.

Keywords: Engineering education, modernization, active learning, skills development, open educational resources