



Pontificia Universidad
JAVERIANA
Bogotá

Digital Ergonomics

Área de Infraestructura, Tecnología
Productividad y Ambiente

▶ Curso presencial

Educación **Continua**

Generamos experiencias educativas

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Hourly intensity
24 Hours

Schedule

16, 17 and 18th of July

Value proposal

The trend of digitization every day becomes more relevant in the world of science and ergonomics has not been apart from this phenomenon where many aspects are needed to consider when an intervention is made, its implementation is very expensive for companies and even more, it is unknown if the impact was the desired¹. The results of these trends are software tools, virtual environments, and electronics devices which include sophisticated digital human models and the latest ergonomic methods. Each instrument has its strengths and weaknesses. For example, The Virtual Reality (VR) be appointed as one of the most use tools in the manufacturing industry to simulate and train the workers. Resulting that the use of VR, it contributes to reduce risks and barriers that in the real world those situations will make it dangerous for trainee personal. The incidence of occupational injuries and diseases associated with industrialization has declined markedly following developments in science and technology, such as engineering controls, protective equipment, safer machinery and processes, and adherence to regulations and labor inspections². The use of VR will contribute to make reduction in occupational risk simulating different work activities.

Objective

This course aims to introduce this trend in a production workplace model and get some idea of how to the use Digitals Ergonomics in safety operation of equipment and machines; simulation and ergonomic analysis of work in risky environments and finally in the programming and operation of the equipment in a specific lay before their implementation.

¹ Patrik Polášek; Marek Bureš & Michal Šimon. Comparison of Digital Tools for Ergonomics in Practice. Procedia Engineering. Volume 100, 2015, Pages 1277-1285

² Hale AR, Hovden J. Management and culture: the third age of safety. In: Feyer A-M, Williamson A, editors. Occupational injury: risk, prevention and intervention. London (UK): Taylor & Francis; 1998. p. 129e66.



Addressed to

The audience is mainly focused on Engineers, Industrial designers, Practitioners and Maintenance staff.

Method

This course uses the fundamentals of ergonomics and the virtual aspects of recreating different situations related to manufacturing and service processes. Additionally, students will have the opportunity to make workshops in class in order to solve doubts and strengthen the concepts.

Academic Content

Section A - Occupational Ergonomics

Topics of ergonomics will be treated in work environments focused on physical (risk assessment and MSDs) and cognitive ergonomics with applications in manufacturing, oil & gas, agriculture (Banana, Flowers, Sugar Cane) transportation, and others.

Lecturer/Teacher: Saavedra-Robinson, Luis. IE, PhD

Section B – Virtual Reality in Industrial Environment

In this section, we will explain the subject of virtual reality, and its importance in industrial environments with applications particularly in the energy sector. The VR is a computer-generated scenario that simulates a realistic experience through which one interacts with a seemingly real or physical way³.

The Javeriana University have created the CAVE room "Cave Assisted Virtual Environment" for use in 3D and immersive engineering applications. The CAVE will work for job training aimed for workers, it offers the possibility to move safely around dangerous places and learn how to deal with emotions, while experimenting the best solutions while far away from the real dangers and the reduction of Musculoskeletal Disorders MSDs

Lecturer/Teacher: Mondragón, Iván. MSc, PhD

³ A. D. Gloria, F. Bellotti, R. Berta, Serious Games for Education and Training, International Journal of Serious Games, Vol. 1, Nr. 1, 2014.



Section C – Digital Ergonomics. Applications in Industry

In this section of the course, the application of digital environments around ergonomics will be presented. For this, we will have the application of these concepts on the automotive industry showing the main strengths and challenges at the time of implementation

Lecturer/Teacher: Hensel-Unger, Ralph, Dr.-Ing.

Speakers

Dr.-Ing. Ralph Hensel-Unger (Germany)

Leader of the implementation of exoskeletons support strategy for VW-group and Audi, at the Industrial Engineering Methods Department.

Business Administration and Electrical Engineering at Chemnitz University of Technology. Doctoral degree in Engineering. Topic of doctoral thesis: “Organizational concept for the implementation of Industrial Engineering in different countries considering cultural differences”.

Saavedra-Robinson, Luis. IE, PhD:

Industrial Engineer from Pontificia Universidad Javeriana Bogotá. PhD in Ergonomics from the Polytechnic University of Catalonia, Barcelona, Spain. Consulting experience in hygiene industrial at oil & gas industry. As a researcher, he looking for the relationship between industrial process, methods and productivity with ergonomics conditions at the workplace, recollecting, analyzing and interpreting a Biomechanical, Anthropometrical and Physiological data for different projects on several sectors: Flowers, Automobile, Sugar Cane, Construction, Foods & Grocery, and Transport among others. As an Assistant Professor, he was the Industrial Engineering undergraduate degree director in Cali, Colombia, where, he leads the international accreditation ABET for the academic program, coordinated the redesign of the curriculum and participated in the national industrial engineering networks (ACOFI). His recent work aims to relate human factors to new trends in the industry (human modeling in industrial environments, industry 4.0, logistics and others).

Mondragón, Iván. MSc, PhD:

Electrical engineer from Universidad Nacional de Colombia, (October 2002). He joined the master program at Universidad de los Andes (Colombia) obtaining a M.Sc. in Electronics and Computers Engineering in May 2005. From 2005 to 2006 he worked as Power Transformers Test Field Engineer at Siemens Andina S.A. (Colombia). After



it, he moved to Computer Vision Group at DISAM -ETSII- Universidad Politécnica de Madrid (Spain) obtaining a Ph.D degree in Automatic and Robotics in November 2011. While completing his Ph.D he gained extensive experience with Unmanned Aerial Vehicles and in particular in vision techniques for control and navigation of Autonomous Helicopter and Multirotor platforms. From August 2013 to February 2019, he collaborates as editor of Journal of Intelligent & Robotic Systems JINT. Since 2013, he is a full time professor and director of the Industrial Automation Technology Center (CTAI), Department of Industrial Engineering at Pontificia Universidad Javeriana. He is currently working on computer vision applied to Unmanned Aerial Vehicles as well as Flexible Manufacturing Systems FMS, Quality Inspection, virtual reality (CAVE system) and Industry 4.0.

Industries

Automotive
Manufacturing
Agriculture
Oil & Gas

And others where manual work predominates