Teaching Guide				
Identifying Data				2024/25
Subject (*)	Design and Ergonomics		Code	771G01030
Study programme	Grao en Enxeñaría de Deseño Industrial e Desenvolvemento do Produto			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Third	Optional	6
Language	SpanishGalicianEnglish			
Teaching method	Hybrid			
Prerequisites				
Department	EconomíaEmpresa			
Coordinador	Lamas Rodriguez, Adolfo	E-mail	adolfo.lamasr@udc.es	
Lecturers	Lamas Rodriguez, Adolfo	E-mail	adolfo.lamasr@udc.es	
Web	www.gii.udc.es			
General description	Ergonomics is the science of designing the job to fit the worker, rather than physically forcing the worker?s body to fit the job. Adapting tasks, work stations, tools, and equipment to fit the worker can help reduce physical stress on a worker?s body and eliminate many potentially serious, disabling workrelated musculoskeletal disorders (MSDs).			

Study programme competences / results	
Code	Study programme competences / results
A1	Aplicar o coñecemento das diferentes áreas involucradas no Plano Formativo.
A3	Necesidade dunha aprendizaxe permanente e continua (Life-long learning), e especialmente orientada cara os avances e os novos produtos do mercado.
A4	Traballar de forma efectiva como individuo e como membro de equipos diversos e multidisciplinares.
A5	Identificar, formular e resolver problemas de enxeñaría.
A6	Formación amplia que posibilite a comprensión do impacto das solucións de enxeñaría nos contextos económico, medioambiental, social e global.
A7	Capacidade para deseño, redacción e dirección de proxectos, en todas as súas diversidades e fases.
A8	Capacidade de usar as técnicas, habilidades e ferramentas modernas para a práctica da enxeñaría.
A9	Capacidade para efectuar decisións técnicas tendo en conta as súas repercusións ou costes económicos, de contratación, de organización ou xestión de proxectos.
A10	Comprensión das responsabilidades éticas e sociais derivadas da súa actividade profesional.
B1	Capacidade de comunicación oral e escrita de maneira efectiva con ética e responsabilidade social como cidadán e como profesional.
B2	Aplicar un pensamento crítico, lóxico e creativo para cuestionar a realidade, buscar e propoñer solucións innovadoras a nivel formal, funcional e técnico.
B3	Aprender a aprender. Capacidade para comprender e detectar as dinámicas e os mecanismos que estruturan a aparición e a dinámica de novas tendencias.
B4	Traballar de forma colaborativa. Coñecer as dinámicas de grupo e o traballo en equipo.
B5	Resolver problemas de forma efectiva.
B6	Traballar de forma autónoma con iniciativa.
B7	Capacidade de liderado e para a toma de decisións.
B8	Traballar nun entorno internacional con respeto das diferencias culturais, lingüísticas, sociais e económicas.
B9	Comunicarse de maneira efectiva nun entorno de traballo.
B10	Capacidade de organización e planificación.
B11	Capacidade de análise e síntese.
B12	Comprensión das responsabilidades éticas e sociales derivadas da súa actividade profesional
C1	Adequate oral and written expression in the official languages
C3	Using ICT in working contexts and lifelong learning.

C4	Acting as a respectful citizen according to democratic cultures and human rights and with a gender perspective
C5	Understanding the importance of entrepreneurial culture and the useful means for enterprising people
C6	Acquiring skills for healthy lifestyles, and healthy habits and routines.
C7	Developing the ability to work in interdisciplinary or transdisciplinary teams in order to offer proposals that can contribute to a sustainable environmental, economic, political and social development.
C8	Valuing the importance of research, innovation and technological development for the socioeconomic and cultural progress of society.

Learning outcomes			
Learning outcomes	Study programme competences / results		
To develop products and workstations that adapt to the characteristics of the user/operator through a multidisciplinary approach, in order to achieve higher levels of comfort and quality of life at work, product quality and productivity.	A1 A3 A4 A5 A6 A7 A8 A9 A10	B2 B12	C8
To develop products and workstations that adapt to the characteristics of the user/operator through a multidisciplinary approach, in order to achieve higher levels of comfort and quality of life at work, product quality and productivity.	A1 A3 A4 A5 A6 A7 A8 A9 A10	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11	C1 C3 C4 C5 C6 C7 C8

Contents	
Topic	Sub-topic
1.- Introduction	Ergonomics vs. Occupational Medicine Types of Ergonomics
2.-Nature and objectives of Ergonomics	Definition and field of activity History and status Ergonomics and related disciplines Objectives of ergonomics Health and safety Productivity and efficiency Reliability and quality
3.-Analysis of Activities Tasks and Work Systems	The context The task and the activity Task analysis methods Execution time Activity, testing and performance Individual and collective work

4.-Ergonomics and Standardization	Protective vs. active approach Types of ergonomic standards Standardization committees Structure of ergonomic standardization committees Preparation of ergonomic standards New role for National Committees ISO CEN cooperation ISO vs CEN difference Fields of ergonomic standardization New concept of standardization: application by the user
5.-Ergonomic Evaluation Methods	Classification of ergonomic methods: Global Assessment, Biomechanics, Movement Repetitiveness, Postural Load, Load Handling and Thermal Environment. Global Assessment: Checklists Postural Load: RULA Method Load Handling: NIOSH
6.-Anthropometry	Anthropometric variables Anthropometric instruments Systems of anthropometric variables Accuracy and errors Statistical processing Sampling and analysis Population anthropometry Adaptation and regulation studies Dynamic anthropometry
7.-Muscular Work	Muscular work in work activities Physiology of muscular work Dynamic muscular work Static muscular work Consequences of muscular overload in work activities Acceptable workload in heavy dynamic muscular work Acceptable workload in manual material handling Acceptable workload for static muscular work Acceptable workload in repetitive work Prevention of muscular overload
8.-Posture at Work	Safety, health and working postures Recording and measuring working postures Measurement methods and techniques Factors affecting working postures Aids and supports for postures adopted while working Health and safety regulations relating to postural elements
9.-Biomechanics	Objectives and principles Applications Manual material handling Postures and movements Recommended weight limits Calculation of the spinal disc compression imposed by the task
10.- Work Organization	Design of production systems From the task to the design of socio-technical systems The complete task concept Worker involvement

11.-Work Positions	Workplace design process The cube modelWorkplace design example: manual welding Data for the design of a workstation
12.-Controls, Indicators and Panels	Design for a seated operator Design for a standing operator Foot-operated controls Selection of controls Prevention of accidental operation Data input devices Indicators: data display devices Visual indicators Control panels and data display devices Labels and warnings

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 A3 A4 A5 A10 A6 A7 A8 A9 B12	10	10	20
Supervised projects	A3 A6 C1 C3 C4 C5 C6 C7 C8	11	33	44
Case study	A3 A6 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11	21	63	84
Personalized attention		2	0	2
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Lectures given in class
Supervised projects	The work will be carried out in groups and will consist of the development of an innovation project based on ergonomics. Projects that can be used as a reference will be studied.
Case study	The professor will analyze and explain exercises and model problems that the student will take as a reference to elaborate one or more group work.

Personalized attention	
Methodologies	Description
Supervised projects Case study	Personalized attention will be given during tutoring hours. In case the student requests academic dispensation, he/she will receive specific personalized attention through the moodle forum, tutorials and e-mail.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Guest lecture / keynote speech	A1 A3 A4 A5 A10 A6 A7 A8 A9 B12	Theoretical knowledge of the subject.	20

Supervised projects	A3 A6 C1 C3 C4 C5 C6 C7 C8	Compulsory works to pass the subject. The student will have to pass each and every one of these practicals in order to pass the subject. There will be a joint defence of all the work groups and the following will be assessed: - Presentation. - Results. - Originality and innovation. - Quality of the presentation.	80

Assessment comments
First opportunity evaluation: a weighted grade will be calculated according to the weights indicated in the Methodologies. Second chance evaluation: the same criteria will be followed as for the first chance evaluation. Advance call: before the date of this call, the student will deliver the works proposed and not approved in the previous calls. The fraudulent performance of the tests or evaluation activities will automatically imply a failure grade "0" in the corresponding call, thus invalidating any qualification obtained in all the evaluation activities. The "students with recognition of part-time dedication and academic exemption of attendance exemption" will communicate at the beginning of the course their situation to the teachers of the subject, as established by the "Standard that regulates the regime of dedication to the study of undergraduate students in the UDC "(Art.3.be 4.5) and the" Standards for evaluation, review and claim of the qualifications of the undergraduate and master's degree studies (Art. 3 e 8b). The students in this situation will be evaluated by solving the same practical cases proposed in exercises through ICT practices.TIC.

Sources of information	
Basic	- Manuel Bestratén Belloví (). Ergonomía. Guía del Monitor. Instituto Nacional de Seguridad e Higiene en el Trabajo. - Ramírez Cavassa (). Ergonomía y Productividad. Limusa Noriega Editores. - F. Javier Llaneza Álvarez (). Ergonomía y Psicosociología Aplicada. Editorial Lex Nova. - Antonio Bustamante (). Diseño Ergonómico. Diaz de Santos S.A - M.H. Miguélez Garrido (). Ergonomía y diseño del puesto de trabajo. Biblioteca de Prevenciónd e Riesgos Laborales. La Ley. - Pedro R. Mondelo (). Ergonomía 3: diseño de puestos de trabajo. Ediciones UPC - Francisco Farrer Velázquez (). Manual de Ergonomía. fundación MAPFRE - Carlos García Molina (). Manual Práctico para la Evaluación del Riesgo Ergonómico. INVASSAT-ERGO - Pedro R. Mondelo (). Ergonomía 1: Fundamentos. Ediciones UPC - del Rio Vilas, D., Longo, F., Rego-Monteil, N. (2012). A general framework for the manufacturing workstation design optimization: a combined ergonomic and operational approach. Simulation Transactions of the Society for Modeling and Simulation International, vol. 89, pp. 306-3
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Innovation and Design Management/771G01043

Subjects that continue the syllabus

Other comments
?Para axudar a conseguir un entorno inmediato sostenido y cumprir có obxetivo da acción número 5: ?Docencia e investigación saludable e sustentable ambiental e social? do "Plan de Acción Green Campus Ferrol":A entrega dos traballos documentales que se realicen nesta materia:Se solicitarán en formato virtual e/ou soporte informáticoSe realizará a través de Moodle, en formato dixital sen necesidade de imprimilos Además durante o curso:Se debe facer un uso sostenible dos recursos y a prevención de impactos negativos sobre o medio naturalSe debe tener en conta a importancia dos principios éticos relacionados cos valores da sostenibilidad nos comportamentos personales e profesionalesSe incorpora perspectiva de xénero na docencia desta materia (se usará lenguaxe non sexista, se utilizará bibliografía de autores de ambos sexos, se propiciará a intervención en clase de alumnos e alumnas?)Se traballará para identificar e modificar prexuicios e actitudes sexistas, e se influirá no entorno para modificalos y fomentar os valores de respeto e igualdad.Se deberán detectar situacions de discriminación e se propondrán acciones e medidas para correxilas.