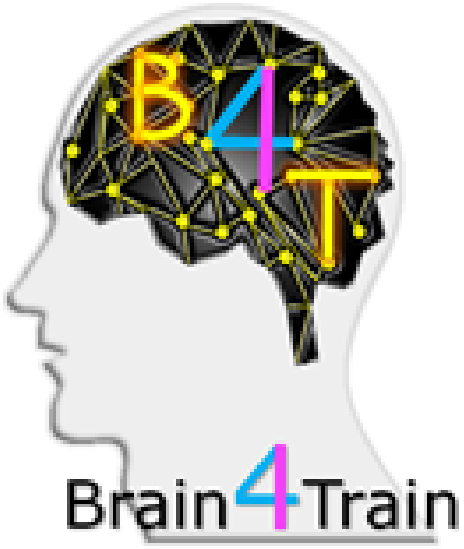
CURRICULUM



PROJECT NUMBER

2017-1-PL01-KA202-038370

PROJECT TITLE

Development of innovative Training contents based on the applicability of Virtual Reality in the field of Stroke Rehabilitation

INTELLECTUAL OUTPUT 1

VET curriculum of the Brain4Train

LANGUAGE

English, Spanish, Italian, Polish

Erasmus+

CONSORTIUM

Politechnika Śląska

IBV INSTITUTO DE BIOMECÁNICA DE VALENCIA

Fondazione Politecnico di Milano

ESPRM European Society of Physical & Rehabilitation Medicine

Disclaimer: This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein

VET on the applicability of Virtual Reality in the field of Stroke Rehabilitation

40-hour curriculum for Brain4Train course

INTRODUCTON

Course aim	BRAIN4TRAIN arises to generate a learning offer addressed to healthcare professionals involved in the use of new technologies for the assessment and the treatment of neurological diseases, especially stroke or cerebrovascular accident (CVA) in Europe, to complement the learning outcomes of current formal high educational programmes with a training in new technologies for assessment and treatment of post-stroke patients. The aim of the course is to give learners the needed knowledge about: – general and specific aspects of stroke accidents and rehabilitation procedures; – new and innovative technologies and devices for stroke rehabilitation; – technical and clinical aspects of using Virtual Reality and biomechanics systems in stroke rehabilitation; – examples of supporting motor and cognitive rehabilitation based on Virtual Reality and biomechanical systems.
Total amount of teaching hours	40 hours
Modules	Module I – Introduction to stroke rehabilitation Module II – Biomechanics in stroke rehabilitation Module III – Virtual Reality in stroke rehabilitation Module IV – Case Studies
Target group definitions	Physical and Rehabilitation Professionals (Physicians, Physiatrists, Neurologists, Physiotherapists, Orthopedists, Rheumatologists)
Prerequisites for participation	Basic knowledge in: – Cerebrovascular diseases – Procedures for post-stroke rehabilitation – Basic equipment for post-stroke rehabilitation – Basics of biomechanics – Knowledge of English, or one language among Spanish, Italian or Polish.
Academic tutors profiles	Depending on modules and/or sessions

Pedagogical resources	– Learning material. Didactical digital material, in which both textual and graphical/visual information are combined to promote active learning, has the aim to provide trainees with the main required knowledge about each topic. – Video presentations. Each session includes video with main training content that is basically presented by lectures and is subtitled in the different languages. – Bibliography and references. Each session includes both references cited into the text and additional bibliography recommended to expand the reading. The online structure of the course will permit that the citing is dynamically linked, so each citation can lead to its reference. – Images and illustrations. All the contents are widely improved and explained with images, tables and graphs. The images will allow not only to explain and expand some concepts treated in the text, but also to ease the reading and insert pauses in the learning process. – Insertions. To avoid plain text and transform the linear reading into more active reading, the text in each unit has specific insertions with the purpose to reinforce the content. The main insertions considered for the Brain4Train course are the following: • Concept. Important concepts or citations. • Examples • Remark boxes. Useful to emphasize or summarize some important concept that have been previously explained. • Enlargement of concepts. Additional information, that it is not strictly necessary for learning basic concepts, but that can enlarge the knowledge about one particular topic. – Multimedia materials: a collection of multimedia resources which show in graphic way the application, in real context, of the contents described during the module
The procedure of assessment and examination	The procedure is divided into three components: – Self-assessment questionnaires: the learner must fulfil an assessment questionnaire and pass it before starting with the next session of each module. The learner can undertake the assessment as many times as wanted. The teaching system will display their successes and mistakes and, based on these answers, will give information about what content should be reviewed in the event of not attaining the learning goals/meeting the examination requirements. In the case of a formal training system, the realization of the self-assessment is not reflected in the final grade. – Self-evaluation tests: before finishing a module, a self-evaluation test must be performed before starting the next module. The self-evaluation tests will normally consist of questions with 3 or 4 answers requiring an analysis, from which the trainee must select the correct one. When the test has been completed, the application will correct it automatically and will show the mark obtained by the learner. – Final examination: after finishing the last module, the last step of the learning assessment is to take the final examination. It will consist of questions for every module, which will regard all training topics and the learner must select the correct answer from

	multiple choices. The final examination will not be available to the trainee at any time, but it must be done only during one previously defined day (the date of the final examination will be stated before starting the online course). The learner will perform it at home, but he or she will have only 45 minutes to complete it.
Technical infrastructure	e-learning Platform

MODULE 1: INTRODUCTION TO STROKE REHABILITATION

Module description	In this module, the trainee learns about overall insight about physiopathology, epidemiology, clinical features, prognosis and functional evaluation in stroke. Highlighting the importance of a comprehensive evaluation of impairments, the present scientific evidence on rehabilitation in stroke are provided. All kind of functional impairment are considered (cognitive, motor, sensitive). In addition, new technology in the rehabilitation process of patients are described from the use of robotic devices (like Lokomat or other kind of exoskeleton devices), to the most accessible and usable systems. A brief introduction to biomechanics and Virtual Reality is also done. In addition, contents are supported with scientific evidence available in each case.
Total amount of teaching hours	7 hours
Sessions	Session 1: Stroke: clinical features, impairment and functional evaluation from a holistic point of view (2 hours) Session 2: Stroke and rehabilitation. State of the art and scientific evidences. Clinical Practice Guidelines (3 hours) Session 3: Introduction to new technologies in rehabilitation. Neurophysiological basis and State of the art (2 hours)
Academic tutors profiles	Academic tutors must possess detailed theoretical and practical knowledge from various disciplines: neurology (with clinical experience), research (experienced in clinical research), physiotherapy, neurologopedics, psychology and psychotherapy, ergotherapy and occupational therapy. Particularly these specialists should be experienced professionals in the following fields: biomechanics, rehabilitation professionals and virtual reality (medics and engineers)

SESSION 1: STROKE: CLINICAL FEATURES, IMPAIRMENT AND FUNCTIONAL EVALUATION FROM A HOLISTIC POINT OF VIEW

Total amount of teaching hours	2 hours			
EQF´s LEVEL	LEVEL 5			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows the etiopathogenic classification of stroke and the differences according to mechanism (ischemic vs. hemorrhagic) – Knows the epidemiology of stroke – Knows the different subtypes according to the origin and location of the stroke – Knows differences in clinical features and impairments caused by each of the stroke subtypes – Knows evaluation methods and scales used for the assessment of any sort of impairment in patients with stroke	The learner: – Differentiates the pathophysiological mechanisms that cause different types of stroke and its relationship with the clinical features and impairments in each case – Recognizes main differences according to the type and subtype of stroke in relation to clinical course, prognosis and functional alteration – Uses classical methods and main scales to perform a global functional assessment of stroke patients	The learner: – Is able to select the most appropriate methods to comprehensively assess a patient with stroke – Is able to carry out a complex and complete functional evaluation by selecting the corresponding tools and scales in each case, according to the type of impairment – Is able to determine the functional and clinical prognosis of a patient with stroke based on the type and subtype of stroke, as well as on the overall functional deficit	The learner is acquainted with: • Physiopathology and epidemiology of stroke. • Types and subtypes of stroke. Overall Classification. • Clinical features,and prognosis according to type&subtype of stroke • Comprehensive functional evaluation in stroke: ○ Approach to scales, classic test and most widespread and appropriate methods to perform a comprehensive evaluation of impairment in stroke.

SESSION 2: STROKE AND REHABILITATION. STATE OF THE ART AND SCIENTIFIC EVIDENCES. CLINICAL PRACTICE GUIDELINES

Total amount of teaching hours	3 hours			
EQF´s LEVEL	LEVEL 6			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows which are the main aims and phases in the rehabilitation of stroke according to clinical features, type of stroke and prognosis – Knows the different approaches on the rehabilitation of stroke according to type of impairment.: cognitive, motor and sensitive functional impairments – Knows recommendation and level of evidence existing for each approach or method. – Knows neurophysiological foundations of rehabilitation treatment.	The learner: – Stablishes goals and designs a rehabilitation treatment for stroke according to functional impairments – Recognises the best and more recommended methods in each case, regarding up-to-date scientific evidence and clinical guidelines	The learner: – Is able to design and plan a rehabilitation treatment in stroke addressing all sorts of impairments and according to phase and scientific level of evidence – Is able to choose the best tools and approaches in each case according to existing evidence – Is able to recognize how rehabilitation works in each case and its neurophysiological foundations	The learner is acquainted with: • Scientific evidence on rehabilitation regarding cognitive, motor and sensitive functional impairments • Level of evidence of each therapeutic approach in rehabilitation of stroke according to scientific literature • Clinical Guidelines in the rehabilitation of stroke. Recommendations and level of evidence. Clinical features and prognosis according to type&subtype of stroke • Motivation aspect of rehabilitation process in stroke • Neurophysiological foundations of each therapeutic approach in stroke

	– Knows main official clinical guidelines that address rehabilitation in stroke			

SESSION 3: INTRODUCTION TO NEW TECHNOLOGIES IN REHABILITATION. NEUROPHYSIOLOGICAL BASIS AND STATE OF THE ART

Total amount of teaching hours	2 hours			
EQF´s LEVEL	LEVEL 6			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner knows: – the different kinds of technologies available in the rehabilitation field, in general those regarding motor impairment assessment and recovery – which are the new technologies already used in rehabilitation with special regards to post-stroke rehabilitation – the main input and output that different devices' typologies are able to exploit	The learner understands: – the basis that are behind the new technologies used to support rehabilitation – the rehabilitation principles that exploit brain plasticity and the biomechanical principles used by rehabilitation tools to take advantage from this plasticity – that rehabilitation technologies gather kinematic or kinetic outcomes for adapting the rehabilitation programs of such tools – the main measurements used by rehabilitation tools that can be	The learner is able: – to distinguish the different kinds of technological tools that can be used to support the rehabilitation process according to the principal characteristics of the methodology adopted by such devices – to select, in real clinical conditions, the most suitable devices for each typology of impairment – to identify the kinematic and kinetic data used and to select those that may be more useful for recovering different typical	The learner is acquainted with: • New technological tools that are used to support the rehabilitation process • Principal characteristics of the methodology adopted by such devices. • Neurophysiological principles these tools are based on in order to recover different impairments characterizing post-stroke. • Rehabilitation tools used for recovering motor function • State of the art in the field of the technologies already

	– the neuro-physiological basis that are behind the mechanisms employed by such technologies – the state-of-the-art tools that can be used in rehabilitation, of post stroke people in particular, according to their impairment	used as an index of patients' current performance	impairments characterizing post stroke survivors – to adapt the difficulty levels of the sensorimotor tasks	available or being developed and mainly used for research

MODULE 2: BIOMECHANICS IN STROKE REHABILITATION

Module description	In this module a trainee learns about the basis of biomechanics, and the ways in which it can provide support during the rehabilitation process in stroke. Particularly knowledge of biomechanical aspects of normal and pathological gait, typical findings in stroke, and how this function can be objectively evaluated by means of specific instrumentation are provided in this module. In addition, it is explained how this function can be objectively evaluated by means of biomechanical systems and how these devices could be used as treatment assistants. This module is also focused on biomechanical mechanisms to maintain balance and stability in normal and pathological subjects, and how they tend to be modified in stroke. In addition this module exposes the ways in which biomechanical instrumented analysis can provide help clinicians making decisions.
Total amount of teaching hours	11 hours
Sessions	Session 1: Introduction to Biomechanics. Clinical Basis and Usefulness in the Rehabilitation Field (3 hours) Session 2: Biomechanics and functional assessment of Gait in Stroke (3 hours) Session 3: Biomechanics and functional assessment of Balance in Stroke (3 hours) Session 4: Biomechanics and its role in therapeutic decision-making (2 hours)
Academic tutors profiles	Academic tutors must be fully qualified and count on a vast theoretical and practical knowledge in various fields related to biomechanics and stroke, like neurology, research (experienced in clinical research), physiotherapy, neurologopedics, and occupational therapy. In addition, they will be trained and experienced in biomechanical functional assessment. These professionals will be particularly specialized in biomechanics and in physical and rehabilitation medicine (including physicians and engineers).

SESSION 1: INTRODUCTION TO BIOMECHANICS. CLINICAL BASIS&USEFULNESS IN THE REHABILITATION FIELD

Total amount of teaching hours	3 hours			
EQF´s LEVEL	LEVEL 5			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows about basics concepts in biomechanics related to kinematic and kinetic parameters. – Knows how to interpret basic kinetic and kinematic data – Knows main biomechanical system and tools that can be used to measure each parameter – Knows the advantages of biomechanical assessment compared to classical functional assessment – Knows the applicability of biomechanical functional assessment within the field of stroke rehabilitation	The learner: – Differentiate basic biomechanical kinetic and kinematic parameters. – Distinguishes in which cases is better to measure functions with objective biomechanical tools than with classical methods. – Chooses the appropriate tool or system to measure certain biomechanical parameters.	The learner – Is able to interpret main biomechanical kinetic and kinematic parameters – Is able to choose the most appropriate tool or equipment to measure each type of parameter (kinetic or kinematic) related to a certain human function or movement. – Is able to address the difference between biomechanical assessment tools and classical measurement methods, and to select which one would be the most appropriate depending on the case. – Is able to recognize the link between human functions and biomechanics.	The learner is acquainted with: • Functional assessment in the rehabilitation field. • Functional assessment: classical methodology VS biomechanical instrumented analysis. • Dynamic and Kinematic parameters and its relation with human movements and functions. • Main tools aimed to perform biomechanical instrumented analysis. • Utility of biomechanical functional assessment within the Rehabilitation Field.

SESSION 2: BIOMECHANICS AND FUNCTIONAL ASSESSMENT OF GAIT IN STROKE

Total amount of teaching hours	3 hours			
EQF´s LEVEL	LEVEL 6			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner knows: – how a biomechanical gait analysis is performed – which measurements are taken or processed to obtain both kinematic and kinetic variables. – the meaning of these variables and their patterns as a function of the gait phases during normal walking – the main factors influencing these patterns (age, gender, velocity) and how to consider such influence on the analysis of pathological walking. – the main pathological factors leading to abnormal walking patterns which are most frequently observed in post-stroke individuals.	The learner understands: – the biomechanical features that can be used, in general, for gait assessment and, in particular, in the analysis of post-stroke people during locomotion. – the relationships between biomechanical patterns and the movement at the level of each body segment and lower limb joints. – the relationships between the abnormalities observed in the patterns and the main walking alterations due to impairment. – the existence of compensatory strategies that can be adopted by the post-stroke people to improve walking efficiency.	The trainee is able: – to gather useful information from the biomechanical measures, and to use such information after correctly interpreting its meaning. – to compare the different kinematic and kinetic variables with normal patterns for identifying abnormal patterns and the relationship between specific alterations and the functional impairments due to stroke. – to identify, on the basis of the analysis performed, the joints where most likely a focused rehabilitation program would result in a better recovering of walking. – to hypothesize possible interventions in the rehabilitation path from the links between analyzed patterns and other assessments performed on the same patient.	The learner is acquainted with: • Gait analysis as an objective methodology for assessment of locomotion in post-stroke people. • Analysis of the relationship between abnormal patterns in post-stroke people suffering from impairments frequently observed in these persons • Analysis of main factors influencing walking patterns, which are related to both categories, namely, normal and pathological

SESSION 3: BIOMECHANICS AND FUNCTIONAL ASSESSMENT OF BALANCE IN STROKE

Total amount of teaching hours	3 hours			
EQF´s LEVEL	LEVEL 6			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows about foundations and physiological basis of normal balance – Knows about physiopathology of balance impairment in stroke – Knows which tools can be used to perform an instrumented balance assessment and which parameters they provide – Knows foundations of posturography – Knows how to interpret basic biomechanical data coming from balance assessment – Knows about typical findings of balance in stroke – Recognises the utility and applicability of biomechanical instrumented assessment of	The learner: – Recognizes which mechanisms cause an impairment in stroke. – Uses tools to measure significant parameters of balance, and the typical findings that can be seen in normal and in pathological balance – Interprets parameters obtained in biomechanical assessment of normal and stroke patient's balance – Can apply posturography and other tools to measure and/or treat balance within the Stroke Rehabilitation field	The learner – Is able to explain foundations and physiological basis of normal balance and can interpret the mechanisms by which stroke causes impairment – Is able to choose the best tool to perform a balance assessment in each case, recognizing its strength and weakness – Is able to interpret biomechanical parameters obtained in the assessment of normal or pathological balance, recognizing typical patterns of stroke – Is able to use information obtained from biomechanical balance assessment in order to control or design a patient's balance treatment – Is able to distinguish when it is useful to use posturography (and/or other instrumentation) to perform a balance assessment or as a treatment assessment	The learner is acquainted with: • Physiologic basis of normal and pathological Balance • Physiopathology of Balance in stroke. Typical findings in patients with stroke • Instrumented Balance assessment: tools and common results • Foundations of posturography. • Biomechanical balance patterns in stroke: examples • Utility of Instrumented Balance assessment&posturography within the Stroke Rehabilitation field

	balance within the field of stroke rehabilitation			

SESSION 4: BIOMECHANICS AND ITS ROLE IN THERAPEUTIC DECISION-MAKING

Total amount of teaching hours	2 hours			
EQF´s LEVEL	LEVEL 6			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows the applicability and usefulness of biomechanical assessment in Neurorehabilitation – Is familiarized with existing scientific evidence on the role of biomechanical functional assessment, with special awareness on neurorehabilitation and stroke	The learner: – Use properly the biomechanical assessment tools used in Neurorehabilitation field, and use this data to support the patient's management	The learner – Is able to recognize the applicability and is able to use the information obtained by means of biomechanical assessment tools in order to support patient's management	The learner is acquainted with: • Brief on the applicability and usefulness of biomechanical assessment in Neurorehabilitation: State of the art • Scientific evidence on the role of biomechanical functional assessment: focus on neurorehabilitation and stroke

MODULE 3: VIRTUAL REALITY IN STROKE REHABILITATION

Module description	Throughout this module, a learner finds content related to the basis of Virtual Reality, and the ways in which it can provide support during the rehabilitation process in stroke. It is important not to skip the neurophysiological foundation of how Virtual Reality would work. Basically the knowledge of how Virtual Reality can help assessing impairment in stroke is included into this module. Additionally the content presents how Virtual Reality can help enhancing cognitive, motoric and coordination skills in patients suffering from ABI.
Total amount of teaching hours	9 hours
Sessions	Session 1: Introduction to Virtual Reality. Clinical Basis&Usefulness in the Rehabilitation Field (2,5 hours) Session 2: Virtual Reality as an assessment tool (2,5 hours) Session 3 Virtual Reality as a treatment assistant (4 hours)
Academic tutors profiles	Academic tutors possess detailed theoretical and practical knowledge on Virtual Reality technologies (from technical and clinical point of view), how to integrate Virtual Reality with stroke rehabilitation, up-to-date world research reports on the scope, advantages and limitations regarding using Virtual Reality. The specialist tutors represents both healthcare professionals and engineers.

SESSION 1: INTRODUCTION TO VIRTUAL REALITY. CLINICAL BASIS&USEFULNESS IN THE REHABILITATION FIELD

Total amount of teaching hours	2,5 hours			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows definition of Virtual Reality – Knows the software basis for Virtual Reality	The learner: – Provides examples of Virtual Reality tools. – Differentiates Virtual Reality Tools in reference to potential	The learner: – Is able to select Virtual Reality functionalities which would support motoric and cognitive rehabilitation	The learner is acquainted with: • The scope and definitions of Virtual Reality – concept, hardware, software

	– Knows hardware components of Virtual Reality – Knows the Virtual Reality market products (consoles) of both for entertainment uses and rehabilitation uses – Knows the scope of functionality of Virtual Reality and its potential for stroke rehabilitation. – Knows the neurophysiological foundation of Virtual Reality	scope of supporting certain impairments of post-stroke patients. – Gives evidence of positive feedback of using Virtual Reality tools in stroke rehabilitation.	– Is able to recognize post-stroke patients' needs in regard to include Virtual Reality technology to rehabilitation process. – Is able to recommend Virtual Reality tool to certain rehabilitation process	• Virtual Reality as a tool for supporting rehabilitation process of post-stroke patients • Applications of Virtual Reality in post-stroke rehabilitation in regard to motoric and cognitive functionality improvements • Virtual Reality tools in self-rehabilitation • Motivation aspects of Virtual Reality in stroke rehabilitation

SESSION 2: VIRTUAL REALITY AS AN ASSESSMENT TOOL

Total amount of teaching hours	2,5 hours			
EQF´s LEVEL	LEVEL 6			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows the functionalities and the applicability of VR tools , including software and hardware, to monitor and assess the rehabilitation progress	The learner: – Can adjust VR functionalities to the assessment objectives and scope – Can select assessment criteria in rehabilitation based on VR tools	The learner: – Is able to define assessment procedures with the use of VR to certain cases of post-stroke patients – Is able to recognize the rehabilitation progress on the basis of VR tools	The learner is acquainted with: • Methods for rehabilitation progress assessment • Functionalities of VR tools regarding rehabilitation assessment

	– Knows the measurement parameters of VR tools for cognitive assessment – Knows the measurement parameters of VR tools for motoric and coordination assessment – Knows the quantitative and qualitative assessment methods, particularly based on VR tools	– Can interpret the assessment results based on VR tools – Can select quantitative and qualitative methods for VR-based assessment of rehabilitation – Can select proper VR tools for both supervised and self-rehabilitation.	– Is able to personalize VR rehabilitation trainings based on assessment results	• VR-based measurements of rehabilitation progress in areas of cognitive, motoric and coordination skills • Examples of using VR as assessment tool

SESSION 3: VIRTUAL REALITY AS A TREATMENT ASSISTANT

Total amount of teaching hours	4 hours			
EQF´s LEVEL	LEVEL 6			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows VR tools for supervised and self-rehabilitation – Knows the functionalities and the applicability of VR tools, including software and hardware, to support	The learner: – Can assess the needs and possibilities of post-stroke patients to use VR tools – Can motivate post-stroke patient to treatment with the assistant of VR tools	The learner: – Is able to define individual rehabilitation schedule and procedure that is based on VR tools for both supervised and self-rehabilitation – Is able to define motivation procedure according to the needs	The learner is acquainted with: • VR based methods for supporting of post-stroke patients' treatment • The functionalities of VR tools regarding treatment of post-stroke patients, particularly

	treatment of post-stroke patients – Knows the teaching and motivating methods of using VR tools by patients – Knows how to select functions of VR tools to enhance cognitive abilities – Knows how to select functions of VR tools to enhance motoric and coordination abilities	– Can select both supervised and self-rehabilitation VR tools – Can select appropriate VR functionalities that support treatment in cognitive dysfunctions – Can select appropriate VR functionalities that support treatment in motoric and coordination dysfunctions	and possibilities of and individual post-stroke patient	with cognitive, motoric and coordination dysfunctions • Examples of using VR as treatment supporting tool

MODULE 4: CASE STUDIES

Module description	In this module the learner has opportunity to know three different case studies of using Virtual Reality and biomechanics systems in stroke rehabilitation process. Specifically, the studies show: – how to assess and control gait ability of stroke patients, – how to use Virtual Reality tools in enhancing cognitive, motoric and coordination skills in post-stroke patients, – know how to adjust Virtual Reality tools to patients needs and expectations (motivation and effectiveness aspects), – overview of games and Virtual Reality tools in stroke rehabilitation process
Total amount of teaching hours	13 hours
Sessions	Session 1: Assessing gait and balance in stroke (5 hours) Session 2: Virtual Reality used as assistant in motor and cognitive rehabilitation (5 hours) Session 3: New horizons: examples of use of other devices (3 hours)
Academic tutors profiles	Academic tutors must be fully qualified and count on a vast theoretical and practical knowledge in various fields related to biomechanics and stroke, like neurology, research (experienced in clinical research), physiotherapy, neurologopedics, and occupational therapy. In addition, they will be trained and experienced in virtual reality applications in stroke rehabilitation and biomechanical functional assessment as well. These professionals will be particularly specialized in biomechanics and in physical and rehabilitation medicine (including physicians and engineers).

SESSION 1: ASSESSING GAIT AND BALANCE IN STROKE

Total amount of teaching hours	5 hours			
EQF´s LEVEL	LEVEL 7			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows how to create application dedicated for people with stroke problems – Knows the software for creating of VR application and projection – Knows the software basis for measurement of kinematic parameters – Knows the devices for measurement of kinematic parameters and motion analysis – Knows the basic of kinematic data processing – know indexes dedicated to evaluation of gait and balance dysfunction – know how to assess and control gait ability of stroke patients	The learner: – Can select diagnostic and rehabilitation program which is able to combine to virtual reality – Can create recommendations to use of virtual reality for balance rehabilitation – Can choose Virtual Reality tools to assess and control gait ability of stroke patients	The learner: – Is able to select appropriate test for diagnostic people with balance problem – Is able to adjust Virtual Reality tools to patients needs and expectations (motivation and effectiveness aspects) in field of gait and balance training – Is able to select games and Virtual Reality tools in stroke rehabilitation processes	The learner is acquainted with: • Recommendations to use of virtual reality for balance rehabilitation. • Review of Virtual Reality tools to assess and control gait ability of stroke patients • Indexes to assessment of static and dynamic balance dedicated for diagnosis of gait and balance impairments

SESSION 2: VIRTUAL REALITY USED AS ASSISTANT IN MOTOR AND COGNITIVE REHABILITATION

Total amount of teaching hours	5 hours			
EQF´s LEVEL	LEVEL 7			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows how to create application dedicated for people with motor and cognitive dysfunction – Knows how to create rehabilitation and diagnostic systems dedicated for people with motor and cognitive dysfunction – Know how to use Virtual Reality tools in enhancing cognitive, motoric and coordination skills in post-stroke patients	The learner: – Can indicate advantage and disadvantage of rehabilitation devices which use virtual reality – Can choose tools for rehabilitation which work with special computer program with implemented rehabilitation scenarios – Can choose Virtual Reality tools in enhancing cognitive, motoric and coordination skills in post-stroke patients	The learner: – Is able to recommend Virtual Reality tool to certain rehabilitation process – Is able to indicate needs of using virtual reality systems for rehabilitation and improvement of motivation to exercises – Is able to select index to assessment level of motor dysfunction in virtual reality systems	The learner is acquainted with: • Recommendations to use of virtual reality for motor and cognitive rehabilitation • Review of Virtual Reality tools to assess and control motor and cognitive dysfunction • Indexes to assessment of motion dysfunction

NEW HORIZONS: EXAMPLES OF USE OF OTHER DEVICES

Total amount of teaching hours	3 hours			
EQF´s LEVEL	LEVEL 6			
Description of learning outcomes	Knowledge	Skills	Competence	Content
	The learner: – Knows the software for Virtual Reality rehabilitation – Knows hardware components of Virtual Reality dedicated for rehabilitation – Knows the Virtual Reality market products of both for entertainment uses and rehabilitation uses – It is familiarized with review of rehabilitation devices which use virtual reality	The learner: – Provides examples of Virtual Reality tools. – Can indicate advantage and disadvantage of rehabilitation devices – Can choose proper devices to rehabilitation of selected motor functions	The learner: – Is able to recognise special function of rehabilitation device which allow to combine it with virtual reality – Is able to choose rehabilitation devices according to selected criteria and hardware parameters	The learner is acquainted with: • Review of rehabilitation devices combined to virtual reality systems • Advantages and disadvantages of using selected devices combined to virtual reality in diagnosis and rehabilitation processes • Overview of games and Virtual Reality tools in stroke rehabilitation process