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CLINICAL MASTER PROGRAM IN REHABILITATION SCIENCES AT JUST (JUST – CRS)

COURSE INFORMATION PACKAGE (COURSE CATALOGUE)

COURSE INFORMATION

Course title	Code	Semester	Theory (hours/week)	Application (hours/week)	Laboratory (hours/week)	National Credit	ECTS
Advanced Clinical Biomechanics	CRS 731	II, III	2	-	1	2	5
Prerequisites	None						
Course language	English						
Course type	Mandatory						
Mode of delivery (face to face, distance learning, blended**)**	Blended						
Learning and teaching strategies	• Lectures • Demonstration • Literature appraisal • Problem solving • Case study • Discussion • Online environment						
Instructor (s)							
Course description	This course builds upon what students gained in the undergraduate study and other courses in the master program of describing and measuring human normal and abnormal movement. The course provides students the opportunity to study advanced techniques in the analysis of factors related to human movement and posture, and integrate their understanding of the neural control of such movement. This course explores the application of biomechanics to pathological disorders of musculoskeletal and neurological system.						
Course objective	To increase students ability to quantitatively analyze and interpret the normal and abnormal motions occurring in disorders of posture, balance and gait performance and making corrections in movement patterns in order to avoid injury and improve performance.						
Learning outcomes	Upon successful completion of the course, the students will be able to: 1- Determine motions of the body during typical activities, and quantify the forces acting on the body during movement. 2- Use of innovative biomechanical acquisition and measurement methods during clinical practice. 3- Utilize the analytical skills necessary to perform a biomechanical analysis of human movement. 4- Develop and justify examination protocols based on an understanding of the						

	biomechanics of the human body. 5- Perform a gait assessment including static and dynamic function and integrate research findings, with theoretical biomechanical knowledge to formulate an appropriate management plan.
Course Content	1- Trunk, lower and upper extremity anatomy and biomechanics. 2- Clinical gait analysis. 3- Pathomechanics 4- Force transducers 5- Electromyography 6- Different biomechanical theories. 7- Critical evaluation of biomechanics research
References	- Richard H. Biomechanics in Clinic and Research: An interactive teaching and learning course. Churchill Livingstone, 2008. - Winters JM, Crago PE. Biomechanics and Neural Control of Posture and Movement. Springer-Verlag New York; 2000. - Winkelstein BA. Orthopaedic Biomechanics. CRC Press; 2012.

COURSE OUTLINE-WEEKLY

Weeks	Topics (Theoretical, Practice – Lab & hands on skills [P])
1.	Introduction to advanced biomechanics. Scientific methods in clinical biomechanics [P]
2.	Biomechanical tissue properties Principles of functional programming [P]
3.	Force measurements Force measurements I [P]
4.	Biomechanics of Injury Force measurements II [P]
5.	Electromyography and muscle activation Electromyography I [P]
6.	Gait assessment including static and dynamic function Electromyography II [P]
7.	Clinical gait analysis and applying theoretical knowledge to a clinical setting Gait cycle and temporal spatial parameters [P]
8.	Mid term
9.	Pathomechanics abnormalities of the trunk, lower and upper limb Gait graphs [P]
10.	Integrate clinical findings with theoretical biomechanical knowledge to formulate an appropriate management plan Gait kinetics and kinematics [P]
11.	The normal and abnormal motions occurring in disorders of posture, balance and gait Student project [P]
12.	The pathomechanical and neurological mechanisms responsible. Students project- Data acquisition [P]
13.	Different biomechanical theories on different clinical problems Students project- Data analysis
14.	Case studies Students project- presentations [P]
15.	Final Exam

**In accordance with the structure of the course, activities such as presentations, projects, seminars, and portfolios can be used in the evaluation system as a midterm exam.*

ASSESSMENT METHODS

Course activities	Number	Percentage**
Attendance		
Laboratory	1	10
Application		
Field activities		
Specific practical training		
Assignments	4	10
Presentation		
Discussion		
Project	1	20
Seminar		
Portfolio		
Online environment*		
Midterms	1	20
Final exam**	1	40
Total		100
Percentage of semester activities contributing grade success		60
Percentage of final exam contributing grade success		40
Total		100

WORKLOAD AND ECTS CALCULATION

Activities	Number	Duration (hour)	Total Work Load
Course Duration (x4)	14	2	28
Laboratory	14	1	14
Application			
Specific practical training			
Field activities			
Study Hours outside the classroom context (Preliminary work, reinforcement, self-directed learning etc.)	14	1	14
Presentation / Seminar Preparation			
Project	1	14	14
Online environment	2	15	30
Homework assignment	4	5	20
Portfolio			
Midterms (Study duration)	1	15	15
Final Exam (Study duration)	1	15	15
Total Workload			150

MATRIX OF THE COURSE LEARNING OUTCOMES VERSUS PROGRAM OUTCOMES

Program Outcomes	Contribution level*				
	1	2	3	4	5
1- Design and implement autonomously a professional approach based on analysis of complex rehabilitation science knowledge					x
2- Design, deliver and evaluate educational process adapted or customize to different inter-professional contexts (academic/professional/community) using an effective pedagogical approach			x		
3- Provide and disseminate new evidence in accordance with research ethics using updated and integrated knowledge of research methods			x		
4- Develop, manage and organize strategic planning and decision making within the scope of the quality assurance, ethical rules, team development and cooperation	x				
5- Integrate health advocacy at an individual, community and policy levels to promote citizenship and inclusive development of communities	x				
6- Communicates effectively within multidisciplinary clinical or scientific contexts, based on collaborative approach.		X			
7- Plan, implement and advocate interdisciplinary healthcare services within deep understanding of health care systems to promote better networking, and comprehensive patient care.		X			

***1 Lowest, 2 Low, 3 Average, 4 High, 5 Highest**