DESCRIPTION/Syllabi of Curricula/Module

Short Name of the University/Country code **Date (Month / Year)**	KU Leuven / BE **P14**
TITLE OF THE MODULE	**Code**
Introduction to Biomechanics – Biomechanics of Orthopaedic Implants	KU Leuven (BE)

Teacher(s)	**Department**
Coordinating: Prof. dr. ir. Kathleen Denis	Mechanical Engineering
Others: dr. ir. Leonard Cezar Pastrav	Mechanical Engineering
ing. Maikel Timmermans	Mechanical Engineering

Study cycle **(BA/MA)**	**Level of the module** **(Semester number)**	**Type of the module** **(compulsary/elective)**
MA	1	compulsory for Clinical Engineering

Form of delivery **(theory/lab/exercises)**	**Duration** **(weeks/months)**	**Language(s)**
theory / exercise sessions	12 weeks	English

Prerequisites	
Prerequisites: Mathematics Dynamics of rigid bodies	**Co-requisites (if necessary):** μ

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
3	80	25 (15 + 10)	55

Aim of the module (course unit): competences foreseen by the study programme

Lectures:

The first part of this course includes a general introduction to the structure and function of the musculoskeletal system: anatomy and physiology of musculoskeletal tissues and joints. It treats the bone structure and forces in joints. The second part of this course reveals more about how an engineer can use his knowledge about electromechanics in this musculoskeletal system. This part treats joint replacing prostheses and testing methods to assess the fixation of implants. In the exercise sessions (seminars), the course material will be illustrated. Selected topics will be covered in more detail, according to the preference of the students. The students learn how to search for scientific articles and how scientific articles are structured.

Seminars:

A list of topics is provided to the students. Selected topics will be covered in more detail, according to the preference of the students. The content is based on recent journal publications.

Learning outcomes of module (course unit)	Teaching/learning methods (theory, lab, exercises)	Assessment methods (written exam, oral exam, reports)
The students can describe the different parts and functional properties of the musculoskeletal system, starting from the fundamental laws of kinematics and dynamics.	theory seminar sessions	written exam report presentation

Themes	Contact work hours							Time and tasks for individual work	
	Lectures	Consultations	Seminars	Practiacl work	Laboratory work	Placements	**Total contact work**	**Individual work**	**Tasks**
The language of biomechanics	3						3	9	study
Bone: an extraordinary material	3						3	9	study
Biomechanical applications of statics	3						3	9	study
Bone-implant systems	1,						1,	4,	study
Total hip arthroplasty	1,						1,	4,	study
Stability of orthopaedic implants	1,						1	4,	study
Ultrasound based tibiofemoral kinematics measurement in knee implant assessment	1,						1,	4,	study
Seminars			10				10	10	literature study and presentation preparation
Total	15		10				25	55	

Assessment strategy	Weight in %	Deadlines	Assessment criteria
report + presentation	bonus	December 4th	quality of report quality of presentation, success of anwering questions
Final exam	100	NA	correctness of answers

Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or internet link
Compulsory literature				
Bartel DL, Davy DT, Keaveny TM	2006	Orthopaedic Biomechanics, Mechanics and Design in Musculoskeletal Systems		Pearson Prentice Hall Bioengineering, ISBN 0-13-008909-5
Tencer & Johnson	1994	Biomechanics in Orthopaedic Trauma		ISBN 9781853171086
Zdero R	2016	Experimental Methods in Orthopaedic Biomechanics		Elsevier, ISBN 978-0-12-803802-4
Additional literature				