TEACHER'S GUIDE SHEET

MODULE	MODULE BIOMECHANICS: FOUNDATIONS OF BIOMECHANICS APPLIED TO THE LOCOMOTOR SYSTEM
DIDACTIC UNIT	E: TECHNIQUES FOR THE INSTRUMENTAL ANALYSIS OF PHYSIOLOGICAL SIGNS AND ANTHROPOMETRIC AND MORPHOMETRIC PARAMETERS E.1. How can I measure physiological signs?
TITLE OF ACTIVITY/CLASS	Psychological signals measurements as a noninvasive way to asses state of internal organs and processes of human body treated as a biological object.
OBJECTIVES	• Clarify the features of selected biomedical signals illustrating the processes and functioning of human internal organs, recorded in non-invasively from the patient's body surface. • Learn how to measure and recognize chosen physiological signs pattern and its specificity, for most common and relevant physiological signals used in diagnosis and therapy.
LENGTH	20 MINUTES OF CLASS IN TOTAL.
PREVIOUS KNOWLEDGE REQUIRED	It is advisable for the student to have at least basic knowledge about physics and human anatomy as well as read the theoretical document associated to this module.
TECHNICAL NEEDS	PC with software for the reproduction of videos with audio and power point presentation. Projector and screen to show contents appropriately to all the students during class
RESOURCES NEEDED	Cards witch examples of chosen physiological signals patterns for students' practices.

	Additionally access to free worldwide physiological signals data base: Physiobank (https://physionet.org/about/database/ , https://physionet.org/ and tutorials: https://physionet.org/about/tutorial/) to observe the shape and features of thousands examples of real recordings of chosen psychological signals to prepare demonstration for students.

DESCRIPTION OF THE CLASS/ACTIVITY

A power point presentation will be used by the professor in order to guide the class:

BASIC CONCEPTS

At the beginning of the lesson selected basic physiological signals and methods of measuring them will be presented by the professor. (4 min).

TASK:

Based on theoretical introduction, students working in groups of 8-12 people will start to practically work with prepared cards, recognizing type, features of chosen, most important physiological signals patterns and their measurements methods (15 min).

EXPLAINING AND SECOND PART OF LECTURE:

After verifying the correctness of answers on cards, professor continues his lecture by presenting in second part modern physiological signals measurement systems solutions – body sensor networks, which gather multi-modal, multi-channel data to send it to remote reasoning system (3 min).

CONCLUSIONS OF THE CLASS

The professor concludes by drawing attention to the crucial role of non-invasively recorded physiological signals in assessing the condition of key human organs and systems in the process of diagnosis and therapy. Professor shows also how much modern technologies progress in the area of: sensorics, electronics and IT support these measurement systems.

TASKS TO BE DEVELOPED BY THE STUDENT IN CLASS

TASK: Students in groups of 8-12 persons based on cards with physiological signals patterns recognize their type, specific features of their patterns and methods of measurements.

- First, students must recognize the type of physiological signals, which pattern is presented on figure and write its name on the card. Patterns are presented on the card in the following order:
  a) electrocardiogram - ECG,
  b) electromyogram - EMG,
  c) blood pressure - BP,
  d) galvanic skin response - GSR,
  e) electroencephalogram - EEG.

- Students analyse and discuss following, most common and relevant physiological signal patterns,

- Students present their observations to professor, who manages short discussion.

They will have 15 minutes to do this task.

EVALUATION METHODOLOGY

The teacher will collect the cards with patterns identified from every student group.

Each card of them should be properly identified by the group ID (one card for one group).

The teacher will evaluate generally the activity of student group.

A general positive/negative overall score is awarded.