

# UNIVERSIDAD AUTÓNOMA DE BAJA CALIFORNIA

COORDINACIÓN GENERAL DE FORMACIÓN BÁSICA  
COORDINACIÓN GENERAL DE FORMACIÓN PROFESIONAL Y VINCULACIÓN UNIVERSITARIA  
PROGRAMA DE UNIDAD DE APRENDIZAJE

## I. IDENTIFICATION INFORMATION

- 1. Academy unit:** Facultad de Deportes, Extensión Ensenada, Facultad de Deportes, Mexicali y Facultad de Deportes, Extensión Tijuana
- 2. Study program:** Licenciado en Actividad Física y Deporte
- 3. Plan duration:** 2021-2
- 4. Name of the learning unit:** Health, Exercise and Sports Assessment
- 5. Code:** 39155
- 6. HC:** 02 **HL:** 00 **HT:** 02 **HPC:** 00 **HCL:** 00 **HE:** 02 **CR:** 06
- 7. Learning stage to which it belongs:** Terminal
- 8. Character of learning unit:** Optional
- 9. Requirements for enrollment to learning unit:** None



**PUA formulated by**

Patricia Concepción García Suárez  
Iván Rentería  
Alberto Jiménez Maldonado

**Signature**

**Approved by**

Esteban Hernández Armas  
Juan José Calleja Núñez  
Samuel Nicolás Rodríguez Lucas

**Signature**

**Date:** November 30, 2020

## **II. GENERAL PROPOSE OF THE COURSE**

Health, Exercise and Sports Assessment is an optional course mainly focused in the improvement of professional skills of the undergraduate program students in the terminal stage of the program, so they can extend the learning of content language integrated as part of the internationalization requisites to be certified as a trainer of exercise physiologist. The current subject involves the up-to-date methods for the assessment of health, exercise, and sports performance to apply exercise interventions in attention of the needs of different populations and the course belongs to the technical-sports area.

## **III. COURSE COMPETENCIES**

To apply the technical language skills of the topics related to the exercise and sports sciences field by analyzing and presenting the up-to-date topics and manuals, practicing sport assessment techniques following international guidelines through sessions implemented in 100% English language for effectively comprehend, communicate and apply different methods for the health-related physical exercise assessment with a high ethics sense, responsibility and respect.

## **IV. EVIDENCES OF PERFORMANCE**

A brief project based in problem-solving cases of health and exercise conditions of a given population in written and oral presentation modality, demonstrating the acquisition of methodological and technical sport-related assessment skills, such as technical language and assessment skills necessary to apply scientific knowledge in exercise prescription or strength and conditioning in athletes.

**V. DEVELOPMENT BY UNITS**  
**UNIT I. Health Assessment**

**Competence:**

Identify the technical language of the principles to screen and evaluate the health status of an individual and subsequently analyze the data through the critical lecture of the operation manuals and operation of the equipment in different test subjects for their categorization in accordance with the international parameters, with responsibility and respect.

**Content:**

**Duration:** 12 hours

- 1.1 Considerations for the physical and health evaluation
  - 1.1.1 Population
  - 1.1.2 Equipment availability
  - 1.1.3 Time availability
- 1.2 Body Composition
  - 1.2.1 Kinanthropometry
  - 1.2.2 Bioelectrical Impedance Method
- 1.3 Blood chemistry
  - 1.3.1 Capillary blood collection and analysis
  - 1.3.2 Venous serum and plasma collection and assessment
- 1.4 Urine analysis
  - 1.4.1 Hydration status
  - 1.4.2 Metabolite assessment
- 1.5 Cardiovascular and Respiratory assessment
  - 1.5.1 Heart rate monitor
  - 1.5.2 Electrocardiogram (EKG)
  - 1.5.3 Oxygen saturation
  - 1.5.4 Spirometry

## UNIT II. Exercise assessment

### Competence:

To assess different parameters that integrate the functional capacity of healthy and morbid populations, by using modern and conventional techniques and an individualized approach, for the assessment, motivation, education and monitoring of subjects regarding their personal health and fitness needs, with honesty and responsibility.

### Content

**Duration:** 10 hours

- 2.1 Energy expenditure
  - 2.1.1 Resting metabolic rate
  - 2.1.2 Energy transfer in exercise
  - 2.1.3 Metabolic calculations for Exercise physiology
- 2.2 Ergometry
  - 2.2.1 Measurement of Work
  - 2.2.2 Measurement of Power
  - 2.2.3 Aerobic capacity
  - 2.2.4 Anaerobic capacity
- 2.3 Integrative cardiovascular evaluation
  - 2.3.1 Exercise Heart rate monitoring
  - 2.3.2 Blood pressure during exercise
  - 2.3.3 Double product
  - 2.3.4 Break-point during exercise
- 2.4 Tests of Muscle strenght, endurance and flexibility
  - 2.4.1 Strenght testing
  - 2.4.2 Endurance tests
  - 2.4.3 Flexion tests
- 2.5 Field tests for functional capacity
  - 2.5.1 Aerobic Capacity Tests
  - 2.5.2 Sport Specific Tests

### UNIT III. Sports Assessment

**Competence:**

To analyze the terminology, coaching techniques and the assessment of the physiological, ergogenic and biomechanical principles of individual and team sports by critically examining international guidelines for sportsmen and athletes, therefore provide a feedback to the coaches and athletes in regard of their execution, with honesty, responsibility and respect.

**Contenido:****Duration:** 10 hours

## 3.1 Measures of health status in sportsmen

3.1.1 Training status

3.1.2 Injury analysis

3.1.3 Choice of training methods

3.1.2 Choice of training order

## 3.2 Energy analysis in athletes

## 3.3 Movement analysis

## 3.4 Data base and follow-up

## VI. STRUCTURE OF WORKSHOP PRACTICES

Practice No.	Practice Name	Process	Support material	Time
<b>UNIT I</b>				
1	International Society for the Advancement of Kinanthropometry (ISAK) workshop.	The teacher will explain with a live model the basic measures of ISAK, subsequently, the student will measure themselves and finally, the measures will be registered in a data base for the calculation of the body composition measurements. The data will be reported in an inform with one week for submission to the teacher.	Plicometer, pachymeter, measure belt, stadiometer and weight scale	6 hours
2	Bioelectrical impedance body composition analyzers	Use of different impedance scales for estimate the body composition of the subject. The teacher will show the students the proper use of different scales and its parameters (e.g. quantities of fat mass and fat-free mass), by running a Bioelectrical Impedance Analysis (BIA)* Thereafter, the students will apply each other a BIA test. The data will be reported in an inform with one week for submission to the teacher.	Body composition analyzers Inbody 770, OMRON BF145 and OMRON scale	3 hours
3	Introductory phlebotomy workshop.	Phlebotomy workshop. The teacher will provide a theoretical approach to properly perform blood collection in different points. The practical portion includes 2 venipunctures on a fake model and their classmates (one vacutainer and one butterfly)	Mannequins for drawing venipunctures, vaccutainer tubes, butterfly needles, tourniquets, gloves, barrels of syringe, alcohol, cotton or gauze, bandage or tape.	4 hours

4	Heart rate variability assessment	Heart rate monitoring at rest and during exercise modalities. Teacher will show in a voluntary subject, the proper use of a Heart rate monitor. Therefore a graded exercise test will be performed in a cycle-ergometer to show the heart rate response, the students will register the heart rate in every step of the procedure. The data will be reported in an inform with one week for submission to the teacher.	Polar H10 heart rate monitors and HRV Elite App.	3 hours
5	Stress EKG for principiants	The teacher will show the students the basics of EKG assemblment in live subjects. Thereafter, the EKG will be recorded while a subject is exercising at different exercise intensities and time-points while the students will register the data. The data will be reported in an inform with one week for submission to the teacher.	M2 Tango stress test monitor with EKG	2 hours
6	Hemodynamics on exercise	The teacher will show the proper preparation for blood pressure and oxygen saturation assessment, the the students will practice the measure between each other and will record both parameters at different exercise intensities in an ergometer. The data will be reported in an inform with one week for submission to the teacher.	M2 Tango stress test monitor	3 hours

7	Spirometry workshop	The teacher and students will measure pulmonary ventilation via spirometry teste, they will be carried out using a device called a spirometer, which is a small machine attached by a cable to a mouthpiece and projected in the device's software. The data will be reported in an inform with one week for submission to the teacher.	Spirometer Silbelmed	3 hours
<b>UNIT II</b>				
8	Strenght assessment	The teacher will instruct one-repetition maximum (1RM) test for assessing the strength capacity of individuals in non-laboratory environments (e.g. Gym).The students will perform 1RM Squat and 1RM bench press and will register the maximal load of the subjects. The data will be reported in an inform with one week for submission to the teacher.	Weights and barbells dependent on muscle group testing (squats and bench press) and GymAware.	4 hours
<b>UNIT III</b>				
9	Energy expenditure test	Using incremental protocols on either a cycle ergometer or treadmill; VO2max ranged from 27 to 81 x ml [kg.sup.-1] x [min.sup.-1]. The participants will complete three steady-state exercise stages	Heart rate monitors (Polar H10), Polar beat and Polar flow coach	4 hours



		on either the treadmill (10 min) or the cycle ergometer (15 min) at 35%, 62% and 80% of VO <sub>2</sub> max, corresponding to 57%, 77% and 90% of maximal heart rate. Heart rate and respiratory exchange ratio data will be collected by the students during each stage in a smartphone app. The data will be reported in an inform with one week for submission to the teacher.	
--	--	---	--

## VII. WORK METHOD

**Framing:** On the first day of class the teacher must establish the method of work, evaluation criteria, and quality of academic work, permissions and teacher-student obligations in accordance with the institutional statute.

**Teaching strategy (teacher)**

The teacher will provide the bibliographic material, practical classes and case – study and problem – solving method with the current communications in international exercise science journals and other academic sources, all provided by the teacher.

**Learning strategy (student)**

The students will use the different equipment, devices and techniques, also resolve case - study/problem scenario offered by the teacher and then search through indexed data bases for the best analysis and action choice to solve that hypothetical scenario.

## VIII. EVALUATION CRITERIA

The evaluation will be carried out permanently during the development of the course unit as follows:

### Accreditation Criterion

- To be entitled to ordinary and extraordinary exam, the student must meet the attendance percentages established in the current School Statute.
- The grade will be scaled from 0 to 100, with a minimum approval of 60.

### Evaluation criteria

- Comprehensive Tests (2)..... 30%
  - Workshop reports.....20%
  - Final presentation.....20%
  - Final project..... 30%
- (Brief project based in problem-solving cases of health and exercise conditions of a given population)
- Total.....100%**

## IX. REFERENCES

Required	Suggested
<p>McArdle, (2009). Exercise Physiology. (7th ed.). United States of America: Lippincott Williams &amp; Wilkins [Classic]*</p> <p>Coombes J., &amp; Skinner T., (2014). ESSA's Student Manual for Health, Exercise and Sport Assessment, (1<sup>st</sup> ed.). Australia: Elsevier [Classic]</p> <p>Crouse, S.F. &amp; Coast J.R., (2017). Clinical Exercise Physiology Laboratory Manual (3rd ed.). USA: Kendal Hunt Publishing.</p>	<p>American College of Sports Medicine. (2014). ACSM's guidelines for exercise testing and prescription (9th ed.) New York: Williams &amp; Wilkins.</p> <p>Donahoo, W. T., Levine, J. A., &amp; Melanson, E. L. (2004). Variability in energy expenditure and its components. <i>Current opinion in clinical nutrition and metabolic care</i>, 7(6), 599–605. <a href="https://doi.org/10.1097/00075197-200411000-00003">https://doi.org/10.1097/00075197-200411000-00003</a> [Classic]</p> <p>Eston, R., &amp; Reilly, T. (2009). Kinanthropometry and exercise physiology laboratory manual: tests, procedures and data: volume two: physiology. (3<sup>rd</sup> ed.). USA: Routledge [Classic]</p>

## **X. TEACHER PROFILE**

The teacher of the course should be graduate level professional (from M.S. to Ph.D.) with expertise in the exercise and biological sciences field in the last two years, with the dominance of the English language (at least B2 of the Common European Framework of Reference) and completed an International Content Integrated Language Learning (CLIL) course. The teacher will also have an extensive background in research in foreign language and at least two years of pedagogical training with a high ethics sense.