UCL Université catholique de Louvain

LBRAL2102

2015-2016

Physiological and nutritional biochemistry

5.0 credits	52.5 h	1q

Teacher(s) :	Larondelle Yvan (coordinator) ; Schneider Yves-Jacques ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	Icampus
Prerequisites :	The set of competences, abilities and knowledge acquired during a bachelor degree in the area of Bioscience engineering.
Main themes :	- A detailed description of the processes of digestion and absorption - A review of the main aspects of the metabolism of glucides, lipids and protides, with a special focus on the regulation and on the fate of the dietary constituents - An integrated view of the main metabolic pathways via the analysis of some specific physiological situations (fasting, diabetes, exercise, pregnancy, lactation) - A detailed analysis of the dietary requirements of humans (energy, nitrogen, amino acids, essential fatty acids, vitamins, water, minerals, dietary fibre), including the biochemical, metabolic and physiological justifications for them - A detailed presentation of the concept of 'healthy food' in relation with some chronic diseases such as type-II diabetes, cardiovascular diseases, metabolic syndrome, osteoporosis, obesity, neurodegenerative diseases, intestinal diseases.
Aims :	a. Contribution de l'activité au référentiel AA (AA du programme) 1.1 ; 1.2 ; 1.4 ; 2.5 b. Formulation spécifique pour cette activité des AA du programme At the end of the course, the student will be able : - to make to links between the major pathways of the energetic and nitrogen metabolism, - to expose the metabolic relationships between the different organs and physiological functions of the organism, - to discuss the impact of food items, specific nutrients, and feeding behaviours on human metabolism, - to give a justification for the nutrient requirements of humans, - to comment on the concept of « healthy food », - to give a sound opinion on the industrial developments in the frame of the « healthy food » concept, - to make practical and innovative proposals for the development of food items. *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods :	Oral examination (with a written preparation) based on questions related to physiological biochemistry and on the interpretation of the nutritional information available on the label of a food item. Written examination based on questions related to nutritional biochemistry and to the strategy of an innovative agro-food company in terms of 'healthy foods'. This part of the exam may be organized either during the exam sessions or be split into short tests during the course. The students will be informed during one of the first meetings with the teacher.
Teaching methods :	Combined set of ex cathedra courses and lectures given by experts upon invitation or in the framework of symposia Most of the activity requires the presence of the students.
Content :	1. Table of contents : The course is composed of six complementary parts: A. Digestion and absorption (6h) B. Regulation of the intermediary metabolism (12h) C. Biochemistry of the lactation process (6h) D. Requirements in the major nutrients (7h) E. Requirements in vitamins and minerals (7h) F. Relationship between alimentation and health (11h) 2. Explications complémentaires (si nécessaire) The last part of the course includes lectures given by senior scientists specialized in the field(in the framework of symposia or upon specific invitation). The course starts with a detailed study of the physiology of digestion and absorption, followed by a synthetic summary of the metabolism of carbohydrates, lipids and protides. It continues with the relationships between nutrition and metabolism through several examples of specific metabolic situations, such as fasting, lactating or suffering from diabetes. The course then presents the nutritional requirements of humans together with the corresponding recommended daily allowance, in terms of energy, nitrogen, amino acids, essential fatty acids, vitamins, water, minerals and dietary fibre, with, in each case, a special focus on the biochemical justification of the needs. It ends up with the relation between nutrition and human health improvement, through the analysis of specific topics such as the impact of dietary lipids on cardiovascular diseases, and the concept of 'healthy food'.

	Parts A and B may be taken as a partim of the course and correspond to 2 ECTS. Parts B to E may be taken as a partim of the course and correspond to 3 ECTS. Parts A, B and C may be taken as another partim of the course and correspond to 3 ECTS.
Bibliography :	Written notes or PowerPoint presentation provided by the professors Reference textbooks proposed but not mandatory
Faculty or entity in charge:	AGRO

Programmes / formations proposant cette unité d'enseignement (UE)

Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Biomedical Engineering	GBIO2M	5	-	
Master [60] in Biology	BIOL2M1	5	-	
Master [120] in Agricultural Bioengineering	BIRA2M	5	-	
Master [120] in Chemistry and Bioindustries	BIRC2M	5	-	
Advanced Master in Food Science and Technology	ALIT2MC	5	-	