



Academic year	2015-16
Subject	11258 - Metabolic Integration and Personalised Nutrition
Group	Group 1, 1S
Teaching guide	A
Language	English

### Subject identification

<b>Subject</b>	11258 - Metabolic Integration and Personalised Nutrition
<b>Credits</b>	0.8 de presencials (20 hours) 2.2 de no presencials (55 hours) 3 de totals (75 hours).
<b>Group</b>	Group 1, 1S (Campus Extens)
<b>Teaching period</b>	First semester
<b>Teaching language</b>	Spanish

### Professors

Lecturers	Horari d'atenció als alumnes					
	Starting time	Finishing time	Day	Start date	Finish date	Office
Ana María Rodríguez Guerrero <a href="mailto:amrodriguez@uib.es">amrodriguez@uib.es</a>	15:30	16:30	Monday	14/09/2015	29/07/2016	Q.11 (planta baixa, edifici Mateu Orfila)

### Contextualisation

Learning results:

- To apply the knowledge in metabolic regulation to the elucidation of the integration of the functioning of different organs and cell types.
- To analyse bibliographic sources to identify the mechanisms of the metabolic regulation of the main macronutrients: lipids, carbohydrates and proteins.
- To expose and defend with written and oral presentations the regulation and metabolic integration mechanisms in particular pathophysiological circumstances.

Lecturer: Dr. Ana M. Rodríguez is PhD in Biochemistry and associate professor of the University of the Balearic Islands, with two six-year research expertise stretches recognized by the Spanish Government and sixteen years of teaching experience at the University. She is also an active researcher; at present, her research is focused in the field of gene-nutrient interactions and the relationship of nutrients and early nutritional interventions with the prevention of metabolic disorders associated to energy control, obesity and associated disorders, including the effect on adipose tissue, skeletal muscle and brain health. She has participated in numerous international cooperative research projects.

### Requirements



Academic year	2015-16
Subject	11258 - Metabolic Integration and Personalised Nutrition
Group	Group 1, 1S
Teaching guide	A
Language	English

There are not specific requirements. The subject is highly recommended for those students whose previous studies are Human Nutrition, Chemistry, Medicine, Nursery or similar.

### Skills

#### Specific

- \* EE5 – Knowing the complexity of the metabolism of nutrients.
- \* E1 – Knowing the molecular basis of the interactions of nutrients with the genome and its expression.
- \* E6 – Integrating the knowledge about the main metabolic pathways and the role of nutrients in situations of health and disease.

#### Generic

- \* G10 – Capacity to articulate the knowledge in oral and written presentations.
- \* G12 – Capacity for developing their work in English (lingua franca of the discipline).
- \* G9 – Ability to collect, to systematize and to critically analyse the research and professional bibliography of the discipline.

#### Basic

- \* You may consult the basic competencies students will have to achieve by the end of the Master's degree at the following address: [http://estudis.uib.cat/master/comp\\_basiques/](http://estudis.uib.cat/master/comp_basiques/)

### Content

#### Theme content

- Topic 1. Basic mechanisms for the control and integration of metabolism.  
Basic elements in metabolic control at the molecular and cellular levels; introduction to intercellular communication and signalling transduction pathways.
- Topic 2. Gastrointestinal tract, digestion and absorption; regulatory bases.  
Structure and function of the gastrointestinal system. Phases of digestion in the mouth, stomach and small intestine. Gastrointestinal motility. Salivary, gastric and intestinal secretions. Absorption of nutrients in the small intestine: monosaccharides, amino acids and peptides, lipid absorption, absorption with water and electrolytes and other processes in the small intestine. Balance of water in the gastrointestinal tract. The pancreas. Structure and function. Physiology of biliary secretions and enterohepatic circulation. The large intestine. Structure and function. Intestinal flora. Faeces.
- Topic 3. Nutrition and metabolism of carbohydrates and their regulation.  
Destination of carbohydrates in our diet. Metabolism, and its regulation, of the main carbohydrates absorbed by the intestine: glucose, galactose and fructose. Non-glycaemic carbohydrates. Resistant starch, dietary fibre, oligosaccharides, fermentation in the colon.
- Topic 4. Nutrition and metabolism of lipids and their regulation.  
Lipids in our diet. Lipid metabolism and its regulation: digestion, absorption and transport of lipids in our diet; circulating lipids: structure of lipoproteins and their metabolism; metabolism

Academic year	2015-16
Subject	11258 - Metabolic Integration and Personalised Nutrition
Group	Group 1, 1S
Teaching guide	A
Language	English

of cholesterol and phospholipids; metabolism of fatty acids. Lipid pools in the organism. Nutritional and metabolic effects of fatty acids in our diet. Effect of diet on serum lipids and lipoproteins.

Topic 5. Nutrition and metabolism of proteins and other nitrogenated compounds; regulation and integration of protein metabolism.

Overview of protein metabolism. Protein and amino acid turnover. Protein synthesis. Regulation of translation. Post-translational events. Protein degradation and its regulation. Amino acid catabolism. Amino acid synthesis. Alterations in protein turnover. Interorgan amino acid metabolism. Transport of amino acids and peptides. Breakdown of amino acids in diet and role of specific organs. Molecules derived from amino acids. Non-proteinogenic metabolic functions of amino acids. Other nitrogenated compounds: metabolism of purine and pyrimidine nucleotides.

Topic 6. Integration of the metabolism of carbohydrates, lipids and proteins in the whole body.

Connections between the metabolism of carbohydrates, lipids and amino acids and proteins. Integrated overview of metabolism: daily rhythms in eating and metabolism. Summary: metabolic control and physiological state.

Topic 7. Personalised nutrition and metabolic integration in particular physiological situations: paradigmatic examples.

Metabolic integration and personalised nutrition related to: pregnancy, breastfeeding, fasting, physical training, cardiovascular illnesses, diabetes, cancer and ageing. Influence of genetic factors and individual phenotypes on metabolic integration.

## Teaching methodology

The programmed activities have the main objective of allowing the students to get the basic and advanced knowledge in metabolic integration and personalised nutrition, with special emphasis in the mechanisms of metabolic regulation. Moreover, the combination of the different activities to be done is also focused in allowing the students to take advantage, in a practical way, of the learnt concepts in the interpretation of scientific data and in the development of specific topics related to the subject.

It is important to note that the students have the possibility of 2 itineraries for assessment ( Itinerary A or Itinerary B), and they must decide which itinerary to follow.

**In Itinerary A**, the students must do/deliver the following items: "Theory work developing one subtopic from topic 7", the "Student's oral presentation (about the developed subtopic of topic 7)", the "Practical case" and the "on-line Exam", but considering that in Itinerary A the students must do/deliver all the items (except the oral presentation, which can be done at the end of the term if necessary) in the dates proposed in the timetable of the subject for each item (it will be available at the beginning of the subject) or before. Furthermore, the students following itinerary A have the opportunity to sum 0.3 points to the final mark by attendance to the lessons and their participation in the lessons and in the seminars presented by the other students.

**In Itinerary B**, the students must deliver the same items as in Itinerary A, but instead of doing the "on-line exam" they have to do the "Final Exam" (in the classroom, in the date indicated in the Master's timetable as optional exam), which has a higher weight in the global mark of the subject, taking into account that in Itinerary B the different items can be delivered later than in Itinerary A, since they can be delivered in the date for assessment at the end of the term or in the extraordinary assessment call (the date that appears in the Master's timetable as the day of "optional exam" both in February and in July; we will use 30-60' for the "Final exam" and the rest of the time will be used for the oral presentations of the students that haven't made their oral presentations before).

## Teaching guide

Academic year	2015-16
Subject	11258 - Metabolic Integration and Personalised Nutrition
Group	Group 1, 1S
Teaching guide	A
Language	English

**Teaching language:** a bilingual system will be used. The spoken language of the lessons will be mainly Spanish (although questions can be done and answered in English when necessary), and the teaching materials (slides, papers, books, etc.) will be in English.

### In-class work activities

Modality	Name	Typ. Grp.	Description	Hours
Theory classes	Lessons	Large group (G)	Lessons in the classroom, with the explanation of the lecturer in an interactive way with the students. The objective is to know and understand basic and advanced concepts in metabolic regulation and integration of metabolism.	10
ECTS tutorials	Tutorial sessions	Small group (P)	To help the students with the theory contents and with the preparation of the works for the assessment. Tutorial sessions will be planned when the students ask for them.	4
Assessment	Students' oral presentations (subtopics of topic 7)	Large group (G)	The theory work that the students have prepared (individually) (about one subtopic from topic 7), must be defended by oral presentation accompanied with a slide presentation. For the oral defense, each student will have a maximum of 10-15' (it will be definitively established depending on the number of students) and, afterwards, the students must answer specific questions set by the lecturer.	6

At the beginning of the semester a schedule of the subject will be made available to students through the UIBdigital platform. The schedule shall at least include the dates when the continuing assessment tests will be conducted and the hand-in dates for the assignments. In addition, the lecturer shall inform students as to whether the subject work plan will be carried out through the schedule or through another way included in the Campus Extens platform.

### Distance education work activities

Modality	Name	Description	Hours
Individual self-study	Exam	<p>The objective is to consolidate and expand the knowledge about metabolic integration and regulation of metabolism. The students must do an exam with test questions on aspects relating to metabolic regulation.</p> <p><b>Itinerary A:</b> The students will find the on-line exam in the subject in Campus Extens (the intranet of the University). In the timetable of the subject, a specific time window will be established in which the exam will be available (afterwards it will be definitively closed) (itinerary A). Moreover, once the exam is opened by the student, there will be a maximum of minutes/hours for answering the questions. To facilitate the work of the students and get them familiar with this type of exam, each student will have two attempts for doing the on-line exam. After finishing the first attempt, the student will be able to know the mark achieved, but this mark won't be used for the real assessment of the subject. The important mark will be the one obtained after doing the exam in the second attempt (this mark will be the final mark of the on line exam). Is important to note that in each attempt the student will find DIFFERENT QUESTIONS, coming from a big pool of questions that will be in the informatics system. Thus, the exams of the first and second attempts will be different, and also the exam will be different for different students. If the student does not pass this exam, they will have</p>	3

Academic year	2015-16
Subject	11258 - Metabolic Integration and Personalised Nutrition
Group	Group 1, 1S
Teaching guide	A
Language	English

Modality	Name	Description	Hours
		<p>another opportunity (retake) by doing the Final Exam (in the classroom, in the date indicated in the Master's timetable as optional exam).</p> <p><b>Itinerary B</b> (1 hour max.): exam with test questions, based on the theory concepts of the subject. This final exam can also be used for the retake of the on-line exam (in itinerary A) for those students that haven't pass the on-line exam. This exam will be done in the classroom (with the lecturer) at the end of the term or in the extraordinary assessment call.</p>	
Individual self-study	Practical case	The objective is to put in practice the theory concepts learnt in the subject by the interpretation of specific scientific bibliography. The students must do a practical case work based on the commentary of one scientific article relating to metabolic integration and personalised nutrition proposed by the lecturer. The students will have the opportunity to choose the practical case among two proposed by the lecturer. The specific articles and the questions about them, for the practical case, will be available for students from the beginning of the course, and they may respond to the questions over time and deliver them the day set for them on the subject timetable (itinerary A) or the day set for exam at the end of the term or in the extraordinary assessment call (itinerary B).	12
Individual self-study	Study or the theory contents of the subjects	To consolidate the contents given in the lessons. The students are advised to study the slides of the lessons and to consult the recommended bibliography.	20
Individual self-study	Theory work developing one subtopic from topic 7	The objective is to study in more depth some specific subtopics of topic 7 and show it (afterwards) to the rest of the students. The students must write a theory work developing one of the subtopics from topic 7 more in-depth (which must be defended, afterwards, by oral presentation accompanied with a slide presentation in the classroom). The written report must be delivered the day set for it on the subject timetable (itinerary A) or the day set for exam at the end of the term or in the extraordinary assessment call (itinerary B).	20

### Specific risks and protective measures

The learning activities of this course do not entail specific health or safety risks for the students and therefore no special protective measures are needed.

### Student learning assessment

The students have the possibility of 2 itineraries for assessment (Itinerary A or Itinerary B), and they must decide which itinerary to follow.

**In Itinerary A**, the students must do/deliver the following items: "Theory work developing one subtopic from topic 7", the "Student's oral presentation (about the developed subtopic of topic 7)", the "Practical case" and the "on-line Exam", but considering that in Itinerary A the students must do/deliver all the items (except the oral presentation, which can be done in February if necessary) in the dates proposed in the timetable of the subject for each item (it will be available at the beginning of the subject) or before. Furthermore, the students following itinerary A have the opportunity to sum 0.3 points to the final mark by attendance to the lessons and their participation in the lessons and in the seminars presented by the other students.

**In Itinerary B**, the students must deliver the same items as in Itinerary A, but instead of doing the "on-line exam" they have to do the "Final Exam" (in the classroom, in the date indicated in the Master's timetable

Academic year	2015-16
Subject	11258 - Metabolic Integration and Personalised Nutrition
Group	Group 1, 1S
Teaching guide	A
Language	English

as optional exam), which has a higher weight in the global mark of the subject, taking into account that in Itinerary B the different items can be delivered later than in Itinerary A, since they can be delivered in the date for assessment at the end of the term or in the extraordinary assessment call (the date that appears in the Master's timetable as the day of "optional exam" both in February and in July; we will use 30-60' for the "Final exam" and the rest of the time will be used for the oral presentations of the students that haven't made their oral presentations before).

### Students' oral presentations (subtopics of topic 7)

Modality	Assessment
Technique	Oral tests ( <b>retrievable</b> )
Description	The theory work that the students have prepared (individually) (about one subtopic from topic 7), must be defended by oral presentation accompanied with a slide presentation. For the oral defense, each student will have a maximum of 10-15' (it will be definitively established depending on the number of students) and, afterwards, the students must answer specific questions set by the lecturer.
Assessment criteria	Quality of the slide presentation and its oral defence, as well as the capacity to adapt to the established time for the oral presentation and the answers to specific questions asked by the lecturer.

Final grade percentage: 25% for the training plan A

Final grade percentage: 20% for the training plan B

### Exam

Modality	Individual self-study
Technique	Objective tests ( <b>retrievable</b> )
Description	The objective is to consolidate and expand the knowledge about metabolic integration and regulation of metabolism. The students must do an exam with test questions on aspects relating to metabolic regulation. Itinerary A: The students will find the on-line exam in the subject in Campus Extens (the intranet of the University). In the timetable of the subject, a specific time window will be established in which the exam will be available (afterwards it will be definitively closed) (itinerary A). Moreover, once the exam is opened by the student, there will be a maximum of minutes/hours for answering the questions. To facilitate the work of the students and get them familiar with this type of exam, each student will have two attempts for doing the on-line exam. After finishing the first attempt, the student will be able to know the mark achieved, but this mark won't be used for the real assessment of the subject. The important mark will be the one obtained after doing the exam in the second attempt (this mark will be the final mark of the on line exam). Is important to note that in each attempt the student will find DIFFERENT QUESTIONS, coming from a big pool of questions that will be in the informatics system. Thus, the exams of the first and second attempts will be different, and also the exam will be different for different students. If the student does not pass this exam, they will have another opportunity (retake) by doing the Final Exam (in the classroom, in the date indicated in the Master's timetable as optional exam). Itinerary B (1 hour max.): exam with test questions, based on the theory concepts of the subject. This final exam can also be used for the retake of the on-line exam (in itinerary A) for those students that haven't pass the on-line exam. This exam will be done in the classroom (with the lecturer) at the end of the term or in the extraordinary assessment call.
Assessment criteria	Objective test.

Final grade percentage: 20% for the training plan A

Final grade percentage: 30% for the training plan B

Academic year	2015-16
Subject	11258 - Metabolic Integration and Personalised Nutrition
Group	Group 1, 1S
Teaching guide	A
Language	English

### Practical case

---

Modality	Individual self-study
Technique	Extended-response, discursive examinations ( <b>retrievable</b> )
Description	The objective is to put in practice the theory concepts learnt in the subject by the interpretation of specific scientific bibliography. The students must do a practical case work based on the commentary of one scientific article relating to metabolic integration and personalised nutrition proposed by the lecturer. The students will have the opportunity to choose the practical case among two proposed by the lecturer. The specific articles and the questions about them, for the practical case, will be available for students from the beginning of the course, and they may respond to the questions over time and deliver them the day set for them on the subject timetable (itinerary A) or the day set for exam at the end of the term or in the extraordinary assessment call (itinerary B).
Assessment criteria	Quality and accuracy of the answers to the questions proposed by the lecturer.

Final grade percentage: 35% for the training plan A  
Final grade percentage: 30% for the training plan B

### Theory work developing one subtopic from topic 7

---

Modality	Individual self-study
Technique	Papers and projects ( <b>retrievable</b> )
Description	The objective is to study in more depth some specific subtopics of topic 7 and show it (afterwards) to the rest of the students. The students must write a theory work developing one of the subtopics from topic 7 more in-depth (which must be defended, afterwards, by oral presentation accompanied with a slide presentation in the classroom). The written report must be delivered the day set for it on the subject timetable (itinerary A) or the day set for exam at the end of the term or in the extraordinary assessment call (itinerary B).
Assessment criteria	Quality of the written report delivered, taking into account the contents, structure and the correct use of the bibliography.

Final grade percentage: 20% for the training plan A  
Final grade percentage: 20% for the training plan B

### Resources, bibliography and additional documentation

---

Learning resources:

PowerPoint presentations in lectures.

Use of Moodle environment to transmit content and materials and as an interactive communication tool.

Bibliographic materials (books, scientific articles, databases, etc.).