

EVALUATION OF THE QUALITY OF AGRI-FOOD ANALYSIS LABORATORIES

Course 2020-2021

(Date last updated: 12/07/2020)

(Date of approval at Department Council: 16/07/2020)

MODULE	SUBJECT	COURSE	SEMESTER	CREDITS	TYPE
Complementos de formación	VALUATION OF THE QUALITY OF AGRI-FOOD ANALYSIS LABORATORIES	3º or 4º	1º	6	Optional
TEACHERS ⁽¹⁾			FULL CONTACT ADDRESS FOR TUTORING (Mailing address, phone, email, etc..)		
<ul style="list-style-type: none">ANTONIO GONZÁLEZ CASADO			Dept. of Analytical Chemistry, 3rd floor, Faculty of Science. Office nº 36 email: agcasado@ugr.es		
			TUTORING SCHEDULE AND/OR LINK TO THE WEBSITE WHERE TUTORING SCHEDULES CAN BE CONSULTED ⁽¹⁾		
			Monday and Wednesday: 16:30 to 19:30 h		
DEGREE OF TEACHING			OTHER DEGREES THAT COULD BE OFFERED		
Degree in Food Science and Technology			Degree in Chemistry		
PREREQUISITES AND/OR RECOMMENDATIONS (if applicable)					
It is recommended to have studied the subject ANALYTICAL TECHNIQUES					
BRIEF DESCRIPTION OF CONTENTS (ACCORDING TO GRADE VERIFICATION REPORT)					
<ul style="list-style-type: none">- Quality Principles- Traceability. Reference systems- Uncertainty- Equipment management- Method validation					
GENERAL AND SPECIFIC SKILLS					

¹ See possible update at Logged On > Applications > Teacher Sorting (∞) This teaching guide must be completed following the "Normativa de Evaluación y de Calificación de los estudiantes de la Universidad de Granada" (Regulations for the Evaluation and Qualification of Students at the University of Granada). (<http://secretariageneral.ugr.es/pages/normativa/fichasugr/ncg7121/>)



During the development of the subject, work will be done on the acquisition of the following skills:

- CT.2 Problem solving
- CT.3 Teamwork
- CT.4 Ability to apply theoretical knowledge to practice
- CT.8 Critical Reasoning
- CT.10 Motivation for quality
- CT.12 Information management capability
- CT.15 Project design and management
- CE.3 Know the techniques and perform food analysis that guarantee optimal conditions for human consumption.
- CE.9 Develop protocols for environmental management and quality control in food industries
- CE.15 Inform, train and provide legal, scientific and technical advice to the public administration, the food industry and consumers to design intervention and training strategies in the field of food science and technology

OBJECTIVES (EXPRESSED AS EXPECTED LEARNING OUTCOMES)

- As a consequence of the development of the subject, students must have learned to:
- Know the current legislation applicable to Food and Agriculture Analysis Laboratories (LAA).
- Know the different quality systems applicable to LAA.
- Know the function of the official control laboratories of food products.
- Know the basics of traceability in chemical tests.
- Know the different types of reference materials.
- Understand the types of interlaboratory exercises.
- Know the basic statistical techniques applicable to an analysis laboratory.
- Know the basics of uncertainty in chemical tests.
- Calculate the uncertainty of equipment calibration
- Compose and calculate the test uncertainty.
- Know the basics of chemical test validation.
- Know and differentiate: accuracy, truthfulness and precision.
- Know and evaluate quality parameters.
- To know the principles of equipment management.
- To know and carry out the management process of the following equipment: balance, volumetric material, pH meter, UV-vis spectrophotometer.

DETAILED AGENDA OF THE COURSE

THEORETICAL AGENDA:

Theme 1: The LABORATORY OF AGRO-ALIMENTARY ANALYSIS.

1. The agri-food laboratory
2. Current legislation
3. Infrastructure for quality: Standardisation, conformity assessment and metrology
4. Quality systems: Certification and Accreditation
5. ISO 9001: Quality management systems. Requirements.
6. ISO 17025: General requirements for the competence of testing and calibration laboratories
7. Laboratories for the official control of foodstuffs

Theme 2: TRACEABILITY



1. General concepts
2. Traceability in chemical tests
3. Reference materials
4. Control charts

Theme 3: UNCERTAINTY.

1. General concepts
2. Calibration Uncertainty
3. Uncertainty in analytical procedures
4. Calculation and expression of uncertainties

Theme 4: METHOD VALIDATION

1. General scheme for the validation of chemical test methods
2. Accuracy: truthfulness and precision
3. Quality parameters of an analytical method
4. Choice of the analytical method

Theme 5: EQUIPMENT MANAGEMENT

1. General concepts
2. Equipment management operations: metrological confirmation systems
3. Management of a scale
4. Management of volumetric equipment
5. Management of a pH meter
6. UV-visible spectrophotometer management

PRACTICAL AGENDA:

Workshops

Computer Workshop 1: Comparing a result to a value. Comparison of two results (t-test)

Workshop computer 2: Simultaneous comparison of several results (ANOVA)

Workshop 3: Formatting I (primary data recording and data processing)

Workshop 4: Formatting II (calibration certificate and test report)

Laboratory Practice

Practice 1: Calibration of a balance.

Practice 2: Calibration of the volumetric material

Practice 3: Calibration of a thermometer

Practice 4: Calibration of a stove

Practice 5: Calibration of a pH meter

Practice 6: Calibration of a spectrophotometer

BIBLIOGRAPHY

FUNDAMENTAL BIBLIOGRAPHY:

MANUAL PRÁCTICO DE CALIDAD EN LOS LABORATORIOS. ENFOQUE ISO 17025. Salvador Sagrado, Emilio Bonet Domingo, María José Medina Hernández, Yolanda Martín Biosca. AENOR 2005

GARANTÍA DE LA CALIDAD EN LOS LABORATORIOS ANALÍTICOS. R. Compañó y A. Ríos. Síntesis. Madrid, 2002

LA CALIDAD EN LOS LABORATORIOS ANALÍTICOS. M. Valcárcel y A. Rios (Editores). Reverté. Barcelona, 1992

COMPLEMENTARY BIBLIOGRAPHY:



CONCEPTO DE CALIDAD EN LA INDUSTRIA Y LABORATORIOS DE ANÁLISIS QUÍMICO. J.M. Andrade García. Universidad de La Coruña. A Coruña, 1999.

AVANCES EN QUIMIOMETRÍA PRÁCTICA. R. Cela. Universidad de Santiago de Compostela, 1994.

PRINCIPIOS DE GARANTÍA DE CALIDAD PARA LABORATORIOS ANALÍTICOS. Garfield, F.M. Association of Official Analytical Chemist (USA), 1991

ASEGURAMIENTO DE LA CALIDAD EN LOS LABORATORIOS DE ANÁLISIS Y DE ENSAYOS. ASOCIACIÓN ESPAÑOLA DE NORMALIZACIÓN Y CERTIFICACIÓN (AENOR), Revoil, G. Madrid, 1998

RECOMMENDED LINKS

<http://www.enac.es/>
<http://www.aenor.es/>
<http://www.juntadeandalucia.es/agriculturaypesca/portal/agenciaagrariaypesquera/centros/red-de-laboratoriosagroalimentarios-y-estaciones-enologicas/index.html>
<http://www.magrama.gob.es/es/alimentacion/temas/laboratorios-agroalimentarios/>

TEACHING METHOD

To carry out the teaching-learning processes, a series of focused training activities are used in the student's work (face-to-face and non- face-to-face/individual.

The training activities to be carried out are:

- Lectures to the Teaching Group (face-to-face).
Competences: CT-5; CT-7; CT-10; CT-15; CE-3; CE9; CE15
- Taught in a conventional classroom.
- Practical sessions in the laboratory in Working Groups (WG) (face-to-face).
Competences: CT-4; CT-10; CT-11; CT-12; CE-3; CE9
- They are held in a meeting room, in the laboratory and in the computer room.
- Seminars organized in Working Groups (WG) (face-to-face).
Competences: TC-3; CE-3; CE-9
- Conducted in the conventional classroom.
- Student's work in the Working Group (WG) (face-to-face and non face-to-face).
Carried out in a meeting room.
- Individual academic tutorials and / or in small groups (non-presential).
- Held in the teacher's office or in the meeting room.
- Individual study and autonomous work (not presential).
- Using the study rooms or the student's home.

The necessary infrastructure for the development of the training activities consists of

- Conventional classroom equipped with technological resources for audiovisual projections.
- Computer room
- Laboratory for equipment calibration.

EVALUATION (EVALUATION INSTRUMENTS, EVALUATION CRITERIA AND PERCENTAGE ON THE FINAL GRADE, ETC.)



Continuous evaluation: Theoretical test: 60%; Internship evaluation 20%, Targeted activities 20%.

In the theory test the student must have a minimum score of 4 out of 10. Attendance at the practical sessions is compulsory. When the student has carried out activities and tests of the continuous assessment process, contemplated in the teaching guide of the subject, which constitute more than 50% of the total weighting of the final grade of the subject, it will be included in the minutes with the corresponding grade, it cannot be considered as "not presented". In the process of continuous evaluation, in the extraordinary call, theory, practices and directed activities will be evaluated following the same structure as in the ordinary call.

DESCRIPTION OF THE TESTS THAT WILL BE PART OF THE FINAL SINGLE EVALUATION ESTABLISHED IN THE "NORMATIVE OF EVALUATION AND QUALIFICATION OF THE STUDENTS OF THE UNIVERSITY OF GRANADA

Single evaluation: two calls, ordinary and extraordinary, and will consist of

- Examination in the theory of the subject (50%).
- Theoretical-practical examination of the subject (50%).

In both tests the student must have a minimum score of 4 out of 10. To take advantage of the final single evaluation, the student, in the first two weeks of the course, or in the two weeks following his/her registration if it has taken place after the beginning of the course, will request it, through the electronic procedure, to the director of the corresponding Department, alleging and accrediting the reasons that he/she cannot follow the system of continuous evaluation.

SCENARIO A (FACE-TO-FACE AND NON FACE-TO-FACE TEACHING AND LEARNING)

TUTORIAL ASSISTANCE

SCHEDULE

(As set out in the POD)

TOOLS FOR TUTORIAL CARE

(Indicate telematic means for tutorial attention)

In the semi-presential scenario, individual tutorials can be done in person, by appointment by the student or by videoconference (GoogleMeet) or email.

MEASURES TO ADAPT THE TEACHING METHODOLOGY

- The proportion between virtual and face-to-face classes will depend on the centre and health circumstances. In the virtual classes the teaching would be concentrated in theory, and in the face-to-face classes the teaching of numerical problems and laboratory practice sessions would be given priority.
- The virtual classes will be taught using Google Meet platforms or those that the UGR may offer in due course. Synchronous teaching will be given priority, although health circumstances (illness of the teacher or family member, family reconciliation, etc...) could impose an asynchronous scenario, providing the video material explained by the PRADO platform accompanied by all the necessary teaching material for the student.
- The platforms (PRADO, Google Meet, Consigna UGR, Google Drive through @go.ugr account, institutional mail,...) are those currently authorized by the UGR. They could be modified if the instructions of the UGR in this respect change during the course.

Ordinary call



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INFORMACIÓN SOBRE TITULACIONES DE LA UGR
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The evaluation will be carried out from:

- Complementary activities: they will have a weight of 20% on the final note, by means of the delivery of an individual work.
- Laboratory practices: they will have a weight of 20% on the final mark, distributed between the assistance to the laboratory for the realization of the same one of presential form (10%) and the delivery of the solved scripts (10%) and the mark of the final examination of practices that will take place next to the one of the theoretical part (10%). If this second part fails with a mark lower than 4, the calculation of this part of the course will be pending for the Extraordinary Call.
- Exam: it will have a weight of 60% on the final grade and only the remaining 40% can be added to it (complementary activities + laboratory practices) as long as the grade obtained is equal or superior to 5 points in total (theory and numerical problems) and never with less than 3 points in the numerical problems. The exam will include theoretical questions of variable extension referring to the concepts seen in the classroom classes and in the classroom seminars, as well as the resolution of numerical problems.

The tests will take place, if the situation allows it, in a face-to-face way. If this is not possible, the tests will be carried out through the Prado Examen platform, always following the instructions given by the UGR at the time.

Extraordinary Call

The same structure will be followed as in the Ordinary Call.

The test will be held in person. If this is not possible, it will be done through the PRADO Examen platform, following the instructions given by the UGR in this regard.

Final Single Evaluation

- Course theory exam (50%).
- Theoretical-practical examination of the subject matter (50%).

In both tests, the student must have a minimum score of 4 out of 10. In order to benefit from the final single evaluation, the student, in the first two weeks of the course, or in the two weeks following his/her registration if it has taken place after the beginning of the course, will request it, through the electronic procedure, to the director of the corresponding Department, alleging and accrediting the reasons that he/she cannot follow the continuous evaluation system.

SCENARIO B (SUSPENSION OF FACE-TO-FACE ACTIVITY)

TUTORIAL ASSISTANCE

SCHEDULE

(As set out in the POD)

SCHEDULE

(As set out in the POD)

Flexible by appointment by email:
(Monday to Friday from 9.00 a.m. to 9.00 p.m.)

In scenario B, they will be attended by Google Meet, Prado or email.

MEASURES TO ADAPT THE TEACHING METHODOLOGY

The development of the course is structured around five types of activities:

- Face-to-face classes: the teacher will offer a global vision of the subject dealt with by using shared Power Point via Skype or Google Meet during normal class hours. A shared digital blackboard is used as an auxiliary tool.
- Individual or team activities: Problem solving using Excel at home. Once solved, each student will send the corresponding screenshots to the teacher.



- Practical computer classes: Seminars will be held, focused on solving chemometrics problems using a shared digital blackboard and Excel (shared via Skype/Google Meet).
- Practical laboratory classes: The teacher will upload a video the day before each practice where the main experimental aspects are commented. In this video the student will be able to see how the experimental part of the practice is done. The teacher will explain to all the students of the subject, the fundamentals and the calculations by means of a shared digital blackboard. Once the explanation is finished, he will provide the students with the experimental data that they would have obtained if they had done the practice in person. The student will have to send by e-mail a photo of the calculations made and the results obtained, to be corrected by the teacher.

MEASURES TO ADAPT THE NON-PRESENTIAL EVALUATION

(Alternative tools for non-presential evaluation, indicating instruments, evaluation criteria and percentages on the final grade)

Ordinary call

Theory exam; 40 multiple choice questions to be answered by PRADO 2. Maximum score 10. Each question marked as incorrect will be subtracted from the value of the question by 50%. Percentage over final rating: 60%,

Practical laboratory activities; Once the laboratory practices have been completed and sent, the teacher will evaluate them.

Percentage over final qualification: 20%.

Individual activities: Troubleshooting with Excel at home. Once solved, each student will send the corresponding screenshots to the teacher. Percentage over final grade: 20%

Extraordinary Call

- Theory exam: 40 multiple choice questions to be answered by PRADO 2. Maximum score 10. Each question marked as incorrect will be subtracted from the value of the question by 50%. Percentage over final rating: 60%
- Practical laboratory activities: Once the laboratory practices have been completed and sent, the teacher will evaluate them. Percentage over final qualification: 20%
- Individual activities: Troubleshooting with Excel at home. Once solved, each student will send the corresponding screenshots to the teacher. Percentage over final grade: 20%.

MEASURES TO ADAPT THE SINGLE FINAL NON-PRESENTIAL EVALUATION

- Theory exam: 40 multiple choice questions to be answered by PRADO 2. Maximum score 10. Each question marked as incorrect will be subtracted from the value of the question by 50%. Percentage over final rating: 75%
- Bibliographic work on a subject related to the contents of one of the parts of the theoretical subject matter of the course. Percentage of final grade: 25%.

ADDITIONAL INFORMATION (If applicable)

