UAB
Universitat Autònoma de Barcelona

Computer Applications

Code: 102397
ECTS Credits: 6

2024/2025

Degree	Type	Year
2500897 Chemical Engineering	FB	2

Contact

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Teachers

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Teaching groups languages

Prerequisites

It is advisable to have basic math knowledge to successfully completed Math sudject from the first course.

Objectives and Contextualisation

Objectives and Contextualisation

The main aim of this course is to train the students in developing a basic understanding about computer science related of numerical methods fundamentals to solve Chemical Engineering problems.

Skills

Apply acquired knowledge to solve common Chemical Engineering problems by using Matlab software. More in detail:

- Achieve practical knowledge in MATLAB programming for solving Chemical Engineering problems.
- Achieve basic notions of most elementary numerical methods for solving Chemical Engineering problems.

Competences

Chemical Engineering
- Demonstrate basic knowledge of the use and programming of computers, and apply the applicable IT resources to chemical engineering.
- Develop personal attitude.
- Develop personal work habits.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.

Learning Outcomes

1. Apply the most basic numerical methods to solve chemical engineering problems.
2. Describe the limitations of computers as digitally programmable systems.
3. Develop independent learning strategies.
4. Maintain a proactive and dynamic attitude with regard to one's own professional career, personal growth and continuing education. Have the will to overcome difficulties.
5. Manage available time and resources. Work in an organised manner.
6. Prevent and solve problems.
7. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
8. Use spreadsheets and numerical programming environments to solve chemical engineering problems.
9. Work autonomously.

Content

Students will be able to access to all learning content through Moodle platform.

MATLAB. Programming language

1. Introduction and MATLAB characteristics
2. Operators with different variables, vectors and matrices.
3. Commands files and functions
4. Basic statements for programming in MATLAB: for … end, while …end, if…elseif….else…end
5. Graphs
6. Polynomial operators
7 Solving lineal and non-lineal systems of equations
8 Approximation and interpolation
9 Derivation and integration
10 Solving ordinary differential equations

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical classes with computer	36	1.44	1, 8
Theoretical classes	12	0.48	1, 2, 8

Type: Autonomous			
Autonomous computer practise	70	2.8	1, 8
Autonomous study	23	0.92	1, 2, 8
Do a task in groups	0	0	1, 3, 4, 5, 6, 8, 9

The course structure is:

a) Theory classes where basical concepts and methods fundamentals are explained. These explanations are applyed in during practical classes. In-person classes will be held in the designated place.

b) Practical Classes (with computers) where theoretical concepts are developed through solving different problems by using MS Excel and Matlab. Theses classes will be also held in-person in the the designated labs and classrooms.

The use of mobile devices is completely prohibited during classes, and it may be grounds for expulsion from the classroom. Additionally, repeated use of the mobile device may result in a penalty of 1 point off the final grade for the subject.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Group task	20%	0	0	1, 3, 4, 5, 6, 8, 9
Partial test 1	30%	3	0.12	1, 2, 5, 6, 7, 8, 9
Partial test 2	20%	3	0.12	1, 2, 5, 6, 7, 8, 9
Partial test 3	30%	3	0.12	1, 2, 5, 6, 7, 8, 9

During the course, various exercises will be carried out in the practical classes where the lack of attendance will penalize students enrolled for the first time. The use of mobile phones during theoretical and practical classes is prohibited, so repeated use may result in a penalty of up to 1 point off the final grade for the subject.

To pass the subject, it will be necessary to obtain a grade equal to or higher than 5.0/10 on average in the different partial tests. Only if this average is above 5 will it be weighted with the group work grade.

Those students who, for work reasons, cannot complete all the practical hours must justify it with a work certificate and will only be evaluated through the partial tests. Students already enrolled previously can choose to access the attitude percentage as long as they attend all the practical classes.

How to retake the subject

If final mark is below 5.0/10, it is possible to pass de course by doing a test that includes all the academic contents and that is equal to the percentage of partial tests and the group task. This test is about the basics concepts, therefore the maximum qualification obtained will be 5.

To access to retake examination it is necessary that students have been evaluated in two thirds of total qualification tests. Thus, students that don't comply these conditions will get "Not evaluated" mark.

High honours mark

High honours mark will be obtained with a final qualification not less than 9.0/10 and not over 5% of total matriculated students.

Penalizations

Notwithstanding anything to other disciplinary measures, those students that incur in different irregularities such as copy, plagiarism, allowing copying and so on., will obtain a 0 mark in the continued evaluation. If those irregularities are detected during secondchance test, the academic course will be directly suspended.

Bibliography

Basic bibliography

1. Resolución de problemas de Ingeniería Química y Bioquímica con Polymath, Excel y Matlab. M.B. Cutlip y M. Shacham. Pearson Educación S.A. Madrid. 2008. ISBN: 978-84-8322-461-8.

2. Matlab con aplicaciones a la ingeniería, física y finanzas. David Lopez Bàez. (2008) ISBN: 978-970-15-1137-4.

3. Métodos numéricos para ingenieros. Steven C. Chapra & Raymond P. Canale. Ed. (2003) McGrwHill. ISBN: 970-10-3965-3

Complemmentary bibliography

1. Matlab. An introduction with applications. Amos Gilat (2008) ISBN 978-0-470-10877-2

2. Essential MATLAB for Engineers and Scientists. Brian D. Hahn & Daniel T. Valentine. (2007) Elsevier. ISBN 13: 9-78-0-75-068417-0

3. Numerical Methods. Germund Dahlquist & Ake Bjorck. Prentice-Hall series in automatic computation. ISBN 0-13-627315.7.1974

Links

http://www.mathworks.es/academia/student_center/tutorials/

http://www.mathworks.es/matlabcentral/

http://www.mathworks.es/academia/student_center/tutorials/

Software

Language list

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	211	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	212	Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	213	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	214	Catalan	second semester	morning-mixed
(TE) Theory	21	Catalan	second semester	morning-mixed