# Calculus II

**Academic Year: ( 2022 / 2023 )** **Review date: 12-07-2022**

**Department assigned to the subject: Department of Mathematics**

**Coordinating teacher: QUINTANA MATO, YAMILET DEL CARMEN**

**Type: Basic Core ECTS Credits : 6.0**

**Year : 1 Semester : 2**

**Branch of knowledge: Engineering and Architecture**

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Algebra.
- Calculus I.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Differential calculus in several variables
1.1 Basic notions in the Euclidean space Rn.
1.2 Funtions of n variables.
1.3 Limits and continuity.
1.4 Differentiability.

2. Local properties of functions
2.1 Higher-order derivatives and differential operators.
2.2 Optimization with and without constraints.

3. Integral calculus in several variables
3.1 Double integrals.
3.2 Triple integrals.
3.3 Change of variables.
3.4 Applications.

4. Integrals over curves and surfaces
4.1 Line and path integrals.
4.2 Surface integrals.
4.3 Integral theorems of vector analysis.

## LEARNING ACTIVITIES AND METHODOLOGY

AF1. THEORETICAL-PRACTICAL CLASSES. Knowledge and concepts students mustacquire. Receive course notes and will have basic reference texts.Students partake in exercises to resolve practical problems
AF2. TUTORING SESSIONS. Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher.Subjects with 6 credits have 4 hours of tutoring/ 100% on- site attendance.
AF3. STUDENT INDIVIDUAL WORK OR GROUP WORK.Subjects with 6 credits have 98 hours/0% on-site.
AF9. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. It entails 4 hours/100% on-site
MD1. THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject`s main concepts are developed, while providing material and bibliography to complement student learning
MD2. PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group
MD3. TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with teacher as tutor. Subjects with 6 credits have 4 hours of tutoring/100% on-site.

## ASSESSMENT SYSTEM

SE1. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. The percentage of the evaluation will be 60% of the final grade.
SE2. CONTINUOUS EVALUATION. It will be given by written exams made in class during the course. The

teacher will inform the students when these will take place at the beginning of the course. The percentage of the evaluation will be 40% the final grade.

| | |
|---|---|
| **% end-of-term-examination:** | 60 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 40 |

## BASIC BIBLIOGRAPHY


- J. E. Marsden and A. J. Tromba Vector Calculus, Freeman, 2013
- S. Salas, E. Hille, and G. Etgen Calculus: One and several variables, Wiley, 2007


## ADDITIONAL BIBLIOGRAPHY


- B. E. Blank and S.G. Krantz Calculus: Multivariable, Wiley, 2011
- J. Stewart Calculus, Cengage Learning, 2012
- R. C. Wrede and M. Spiegel Schaum's Outline of Advanced Calculus, McGraw Hill, 2002
- R. Larson and B. H. Edwards Calculus, Cengage Learning, 2014
- S. Lang Calculus of Several Variables, Springer Verlag, 1987