**Universidad Carlos III de Madrid**
www.uc3m.es

| COURSE: INTEGRATION AND MEASURE | | |
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| DEGREE: **BACHELOR IN APPLIED MATHEMATICS AND COMPUTING** | **YEAR: 2** | **TERM: 1** |

| WEEKLY PLANNING | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| WEEK | SESSION | DESCRIPTION | GROUPS (mark X) | | Special room for session (computer classroom, audio-visual classroom…) | WEEKLY PROGRAMMING FOR STUDENT | | |
| | | | LECTURES | SEMINARS | | DESCRIPTION | CLASS HOURS | HOMEWORK HOURS (Max. 7h week) |
| 1 | 1 | PRESENTATION OF THE COURSE<br><br>LINE INTEGRALS OF SCALAR AND VECTOR FIELDS. REPARAMETRIZATIONS AND ORIENTATION. GRADIENT VECTOR FIELDS. | X | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 1 | 2 | DISCUSSION OF EXERCISES OF THIS SUBJECT | | X | NO | TO SOLVE EXERCISES OF THIS SUBJECT | 1,66 | |
| 2 | 3 | PARAMETRIZED SURFACES. SURFACE INTEGRALS OF SCALAR AND VECTOR FIELDS. REPARAMETRIZATIONS AND ORIENTATION. | X | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |

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| 2 | 4 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 3 | 5 | GREEN'S THEOREM. VECTOR FORM OF GREEN'S THEOREM. DIVERGENCE THEOREM IN THE PLANE. | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 3 | 6 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 4 | 7 | STOKES' THEOREM. CONSERVATIVE VECTOR FIELDS. GAUSS' DIVERGENCE THEOREM. | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 4 | 8 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 5 | 9 | THE CONCEPT OF MEASURABILITY. TOPOLOGICAL SPACES VS. MEASUREABLE SPACES. BOREL SETS. | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 5 | 10 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 6 | 11 | CONTINUOUS FUNCTIONS AND MEASURABLE FUNCTIONS. MEASURE SPACES. COMPLETION OF A MEASURE SPACE. | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 6 | 12 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 7 | 13 | CONSTRUCTION OF MEASURES. CARATHEODORY-HOPF'S EXTENSION THEOREM. LEBESGUE'S MEASURE. BOREL-STIELTJES' MEASURES. IMAGE MEASURES | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 7 | 14 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 8 | 15 | SIMPLE FUNCTIONS. INTEGRATION OF POSITIVE FUNCTIONS. | X | | | NO | | 1,66 | 6,5 |

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| | | LEBESGUE'S MONOTONE CONVERGENCE THEOREM. FATOU'S LEMMA | | | | | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | | |
| 8 | 16 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 9 | 17 | INTEGRATION OF COMPLEX FUNCTIONS. LEBESGUE'S DOMINATED CONVERGENCE THEOREM. THE ROLE PLAYED BY SETS OF MEASURE ZERO | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 9 | 18 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 10 | 19 | DECOMPOSITION OF MEASURES. ABSOLUTE CONTINUITY. SINGULAR MEASURES. RADON-NIKODYM THEOREM. | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 10 | 20 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 11 | 21 | $L^p$ SPACES | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 11 | 22 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 12 | 23 | PARAMETRIC INTEGRALS. CONTINUITY AND DERIVABILITY. INTEGRAL TRANSFORMS. | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 12 | 24 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| 13 | 25 | FOURIER TRANSFORM. APPLICATIONS. | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 13 | 26 | | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |

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| | | DISCUSSION OF EXERCISES OF THIS CHAPTER | | | | | | | |
| 14 | 27 | LAPLACE TRANSFORM. APPLICATIONS. | X | | | NO | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | 6,5 |
| 14 | 28 | DISCUSSION OF EXERCISES OF THIS CHAPTER | | X | | NO | TO SOLVE EXERCISES OF THIS CHAPTER | 1,66 | |
| | 29 | OVERWIEW | X | | | N0 | TO READ THE PART OF NOTES AND TEXTBOOKS ON THIS SUBJECT | 1,66 | |
| | | **Subtotal 1** | | | | | | **48,33** | **91** |
| | | **Total 1** *(Horas presenciales y de trabajo del alumno entre las semanas 1-14)* | | | | | | 139,33 | |

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|---|---|---|---|---|---|---|---|---|---|
| 15 | | TEST 2. TUTORIALS | X | | | NO | | 2 | 6 |
| 16 | | | | | | | | | |
| 17 | | PREPARATION FOR FINAL EXAM AND EVALUATION. | | | | | | 3 | 6 |
| 18 | | | | | | | | | |
| | | **Subtotal 2** | | | | | | **5** | **12** |
| | | **Total 2** *(Horas presenciales y de trabajo del alumno entre las semanas 15-18)* | | | | | | 17 | |

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| **TOTAL** *(Total 1 + Total 2)* | **156,33** |