UNIVERSIDADE DA CORUÑA

| Teaching Guide | | | | |
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| Identifying Data | | | | 2019/20 |
| Subject (*) | Rheophysics of complex fluids | | Code | 730495009 |
| Study programme | Mestrado Universitario en Materiais Complexos: Análise Térmica e Reoloxía (plan 2012) | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Official Master's Degree | 1st four-month period | First | Obligatory | 5 |
| Language | English | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | | | | |
| Coordinador | López Beceiro, Jorge José | E-mail | jorge.lopez.beceiro@udc.es | |
| Lecturers | ,<br>Ponton , Alain | E-mail | <br>alain.ponton@univ-paris-diderot.fr | |
| Web | | | | |
| General description | This course introduces recent strategies for structuring hard materials (nanoparticles, nanocomposites and porous monoliths hierarchically) by complex fluids. Complex fluids that are typically considered: solutions of large molecules (eg polymers.) Or supramolecular structures (eg micelles..) In ordinary liquids, foams or emulsions. The aim of this course is to illustrate how physical concepts of complex fluids can be applied to the rational design of advanced materials. For each system, the emphasis will be on: structure / properties of the final solid materials; the structure and stability of complex fluids. some specific characterization techniques are presented. | | | |

| Study programme competences / results | |
|---|---|
| Code | Study programme competences / results |
| A1 | Set up and conduct tests using the techniques of thermal analysis and rheology most appropriate in each case, within the scope of complex materials |
| A3 | Knowing the different types of thermal and rheological behaviors of the materials |
| B1 | Knowledge and understanding to provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context |
| B2 | The students have the skill to apply their knowledge and their ability to solve problems in new or unfamiliar contexts within broader (or multidisciplinary) contexts related to their field of study |
| B4 | That the students can communicate their conclusions and the knowledge and last reasons behind that conclusions to specialized and non specialized audience in a clear and unambiguous way |
| B8 | Applying a critical, logical and creative way of thinking |
| B12 | Communicate effectively in the work environment |
| B13 | Analysis-oriented attitude |
| B14 | Ability to find and manage the information |
| B21 | To assess the importance of research, innovation and technological developments in the socio-economic and cultural progress of society |
| B22 | Understand the importance of protecting the environment |
| C2 | Have a good command of spoken and writing expression and understanding of a foreign language. |
| C4 | Developing for the exercise of an open, educated, critical, committed, democratic and solidary citicenship, able to analyze reality, diagnose problems, formulate and implement solutions based on knowledge and oriented to the common good. |
| C6 | Critically assessing the knowledge, technology and information available to solve the problems they face with. |
| C7 | To assume as a professional and citizen the importance of learning throughout life. |

| Learning outcomes | |
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| Learning outcomes | Study programme competences / results |

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| This course provides a unified educational introduction of the central aspects of the flow and deformation of complex fluids (eg., Fluid materials structured at different scales). The course objective is to develop a physical understanding of the rheology of complex fluids by teaching conceptual points important basic data analysis and experimental practices. | AR1<br>AR3 | BR1<br>BR2<br>BR4<br>BR8<br>BR12<br>BR13<br>BR14<br>BR21<br>BR22 | CR2<br>CR4<br>CR6<br>CR7 |

| Contents | |
|---|---|
| **Topic** | **Sub-topic** |
| 1. Fundamentals of rheology and viscoelasticity. | Rheology<br>Viscoelasticity |
| 2. Rheometry | Rheometry |
| 3. Rheology of dispersed media | Rheology of dispersed media |
| 4. Industrial applications of complex materials. | Industrial applications of complex materials. |

| Planning | | | | |
|---|---|---|---|---|
| **Methodologies / tests** | **Competencies / Results** | **Teaching hours (in-person & virtual)** | **Student?s personal work hours** | **Total hours** |
| Guest lecture / keynote speech | A3 B1 B21 B22 C6 C7 | 18 | 18 | 36 |
| Laboratory practice | A1 B2 B4 B8 B13 | 20 | 10 | 30 |
| Supervised projects | B12 B14 B21 B22 C2 C4 | 5 | 50 | 55 |
| Objective test | A3 B4 B8 B13 B14 C2 | 2 | 0 | 2 |
| Personalized attention | | 2 | 0 | 2 |
| **(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.** | | | | |

| Methodologies | |
|---|---|
| **Methodologies** | **Description** |
| Guest lecture / keynote speech | Oral presentation (using audiovisual material and student interaction) designed to transmit knowledge and encourage learning. Presentations of this type are variously referred to as ?expository method?, ?guest lectures? or ?keynote speeches?. (The term ?keynote? refers only to a type of speech delivered on special occasions, for which the lecture sets the tone or establishes the underlying theme; it is characterised by its distinctive content, structure and purpose, and relies almost exclusively on the spoken word to communicate its ideas.) |
| Laboratory practice | Practice-based learning method involving activities such as demonstrations, exercises, experiments and research. |
| Supervised projects | Supervised learning process aimed at helping students to work independently in a range of contexts (academic and professional). Focused primarily on learning ?how to do things? and on encouraging students to become responsible for their own learning. |
| Objective test | Written learning progress test, characterised by pre-determined answers. Well-designed tests offer objectively quantifiable results in relation to student knowledge, capacities, skills, performance, aptitudes, attitude, intelligence, etc. Used for diagnostic, formative and summative assessment. May consist of all or any of the following types of questions: multiple choice, ordering and sequencing, short answer, binary, completion, multiple matching. |

| Personalized attention | |
|---|---|
| **Methodologies** | **Description** |

| | |
|---|---|
| Guest lecture / keynote speech<br>Laboratory practice<br>Supervised projects<br>Objective test | The personalized attention to students, understood as a support in the teaching-learning process, will take place in the hours of tutoring of the teacher.<br><br>No academic dispensation is accepted. |

| Assessment | | | |
|---|---|---|---|
| Methodologies | Competencies / Results | Description | Qualification |
| Guest lecture / keynote speech | A3 B1 B21 B22 C6 C7 | Continuous assessment through monitoring of student work in the classroom, laboratory and / or tutorials | 10 |
| Laboratory practice | A1 B2 B4 B8 B13 | Continuous assessment through monitoring of student work in the classroom, laboratory and / or tutorials | 10 |
| Supervised projects | B12 B14 B21 B22 C2 C4 | Activities whose purpose is that the students enlarge the study of ther topics pesented in each theme and consolidate their acquired knowledge and capabilities. These activities should also help the students learn and improve their capabilities in literature survey. | 30 |
| Objective test | A3 B4 B8 B13 B14 C2 | Examination or objective test. | 50 |

| Assessment comments |
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| Sources of information | |
|---|---|
| Basic | |
| Complementary | |

| Recommendations |
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| Subjects that it is recommended to have taken before |
| |
| Subjects that are recommended to be taken simultaneously |
| |
| Subjects that continue the syllabus |
| |
| Other comments |
| Para axudar a conseguir unha contorna inmediata sostida e cumprir co obxectivo da acción número 5: ?Docencia e investigación saudable e sustentable  ambiental e social? do "Plan de Acción Green Campus Ferrol: A entrega dos traballos documentais que se realicen nesta materia: ? Solicitaranse en formato virtual e/ou soporte informático. ? Realizarase a través de Moodle, en formato dixital sen necesidade  de imprimilos. ? En caso de ser necesario realizalos en papel: - Non se empregarán plásticos. - Realizaranse impresións a dobre cara. - Empregarase papel reciclado. - Evitarase a impresión de borradores. ? Débese de facer un uso sustentable  dos recursos e a prevención de impactos negativos sobre o medio natural.   ? Traballarase para identificar e modificar prexuízos e actitudes sexistas, e influirase  na contorna para modificalos e fomentar valores de respecto e igualdade. ? Deberanse detectar situacións de discriminación e propoñeranse accións e medidas para corrixilas. |

**(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.**