



| Teaching Guide           |                                                                                        |        |          |                            |
|--------------------------|----------------------------------------------------------------------------------------|--------|----------|----------------------------|
| Identifying Data         |                                                                                        |        |          | 2020/21                    |
| Subject (*)              | Polymer Processing                                                                     |        | Code     | 730497230                  |
| Study programme          | Mestrado Universitario en Enxeñaría Industrial (plan 2018)                             |        |          |                            |
| Descriptors              |                                                                                        |        |          |                            |
| Cycle                    | Period                                                                                 | Year   | Type     | Credits                    |
| Official Master's Degree | 2nd four-month period                                                                  | Second | Optional | 4.5                        |
| Language                 | Spanish                                                                                |        |          |                            |
| Teaching method          | Face-to-face                                                                           |        |          |                            |
| Prerequisites            |                                                                                        |        |          |                            |
| Department               | Enxeñaría Naval e Industrial                                                           |        |          |                            |
| Coordinador              | Artiaga Díaz, Ramon Pedro                                                              |        | E-mail   | ramon.artiaga@udc.es       |
| Lecturers                | Artiaga Díaz, Ramon Pedro                                                              |        | E-mail   | ramon.artiaga@udc.es       |
|                          | López Beceiro, Jorge José                                                              |        |          | jorge.lopez.beceiro@udc.es |
| Web                      |                                                                                        |        |          |                            |
| General description      | Abordase o estudo dos procesos de transformación industrial dos materiais poliméricos. |        |          |                            |



|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| Contingency plan | <p>1. Modifications in the contents.</p> <p>The content is not modified.</p> <p>2. Methodologies</p> <p>* Teaching methodologies that are maintained</p> <p>Master session (through teams)</p> <p>Tutored works (tutored by teams or email)</p> <p>Objective test (online)</p> <p>* Teaching methodologies that change</p> <p>Laboratory practice. It is replaced by the presentation of practical cases in the master sessions and the reading and discussion of scientific articles (analysis of documentary sources).</p> <p>3. Mechanisms for personalized attention to students.</p> <p>- E-mail: every day. Useful for making queries, requesting virtual meetings to resolve doubts and following up on supervised work.</p> <p>- Microsoft Teams: personalized student tutoring</p> <p>- Moodle: will be used as a repository for documentation provided to students.</p> <p>1. Modificaciones en los contenidos</p> <p>2. Metodologías</p> <p>*Metodologías docentes que se mantienen</p> <p>*Metodologías docentes que se modifican</p> <p>3. Mecanismos de atención personalizada al alumnado</p> <p>4. Modificacines en la evaluación</p> <p>*Observaciones de evaluación:</p> <p>5. Modificaciones de la bibliografía o webgrafía</p> <p>4. Modifications in the evaluation.</p> <p>Master session 10% - Continuous assessment through evaluation of active participation and with use.</p> <p>Mentored work 60% - Presentation of supervised work.</p> <p>Objective test 20% - Presentation of supervised work will be done orally.</p> <p>Analysis of documentary sources 10% - Reading and discussion of articles in scientific journals related to the firm</p> <p>* Evaluation observations: -</p> <p>5. Modifications to the bibliography or webography</p> |
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UNIVERSIDADE DA CORUÑA

No modifications



| Study programme competences |                                                                                                                                                                                                                                                                                     |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Code                        | Study programme competences                                                                                                                                                                                                                                                         |
| B1                          | CB6 - Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.                                                                                                           |
| B2                          | CB7 - That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.                                                                   |
| B3                          | CB8 - That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments. |
| B4                          | CB9 - That the students know how to communicate their conclusions -and the knowledge and ultimate reasons that sustain them- to specialized and non-specialized audiences in a clear and unambiguous way.                                                                           |
| B5                          | CB10 - That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.                                                                                                                                       |
| B6                          | G1 - Have adequate knowledge of the scientific and technological aspects in Industrial Engineering.                                                                                                                                                                                 |
| B13                         | G8 - Apply the knowledge acquired and solve problems in new or unfamiliar environments within broader and multidisciplinary contexts.                                                                                                                                               |
| B14                         | G9 - Be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments.                     |
| B15                         | G10 - Knowing how to communicate the conclusions -and the knowledge and ultimate reasons that sustain them- to specialized and non-specialized publics in a clear and unambiguous way.                                                                                              |
| B16                         | G11 - Possess the learning skills that allow to continue studying in a self-directed or autonomous way.                                                                                                                                                                             |
| C1                          | ABET (a) - An ability to apply knowledge of mathematics, science, and engineering.                                                                                                                                                                                                  |
| C2                          | ABET (b) - An ability to design and conduct experiments, as well as to analyze and interpret data.                                                                                                                                                                                  |
| C3                          | ABET (c) - An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.                                           |
| C6                          | ABET (f) - An understanding of professional and ethical responsibility.                                                                                                                                                                                                             |
| C7                          | ABET (g) - An ability to communicate effectively.                                                                                                                                                                                                                                   |
| C8                          | ABET (h) - The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.                                                                                                                              |
| C9                          | ABET (i) - A recognition of the need for, and an ability to engage in life-long learning.                                                                                                                                                                                           |
| C11                         | ABET (k) - An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.                                                                                                                                                               |

| Learning outcomes                                          |                             |      |
|------------------------------------------------------------|-----------------------------|------|
| Learning outcomes                                          | Study programme competences |      |
| Coñecer os parámetros clave para o procesado de polímeros. | BJ1                         | CJ1  |
|                                                            | BJ2                         | CJ2  |
|                                                            | BJ3                         | CJ3  |
|                                                            | BJ5                         | CJ6  |
|                                                            | BJ6                         | CJ7  |
|                                                            | BJ13                        | CJ11 |
|                                                            | BJ14                        |      |
| Coñecer as técnicas do procesado de polímeros.             | BJ1                         | CJ1  |
|                                                            | BJ4                         | CJ7  |
|                                                            | BJ13                        | CJ8  |
|                                                            | BJ15                        | CJ9  |
|                                                            | BJ16                        |      |

| Contents |           |
|----------|-----------|
| Topic    | Sub-topic |



|                                                                              |                                                                                                                                                                 |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chaves para o procesado de polímeros: características térmicas e reolóxicas. | Propiedades térmicas e reolóxicas.<br>Influencia da temperatura e as transformacións térmicas no comportamento reolóxico.                                       |
| Transformación de termoplásticos                                             | Transición vítrea, fusión e cristalización.<br>Fenómenos de relaxación.<br>Moldeo por inxección<br>Extrusión<br>Soplado e termoconformado.<br>Moldeo rotacional |
| Transformación de termoestables                                              | Curado<br>Diagramas TTT<br>Moldeo por compresión e transferencia<br>Moldeo de termoestables reforzados<br>Moldeo por inxección-reacción                         |
| Cauchos e termoelastómeros                                                   | Caucho natural e cauchos relacionados (SBR, CR, IIR,...)<br>EPDM<br>Termoelastómeros<br>Plastificantes y plastisoles<br>Calandrado                              |

| Planning                                                                                                                        |                                                                     |                      |                               |             |
|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------|-------------------------------|-------------|
| Methodologies / tests                                                                                                           | Competencies                                                        | Ordinary class hours | Student's personal work hours | Total hours |
| Guest lecture / keynote speech                                                                                                  | B1 B3 B5 B14 B16 B6<br>C6 C8 C9                                     | 14                   | 28                            | 42          |
| Laboratory practice                                                                                                             | B2 B3 B4 B13 C1 C2<br>C3 C11                                        | 6                    | 6                             | 12          |
| Mixed objective/subjective test                                                                                                 | B1 B2 B3 B4 B13 B15<br>B14 B6 C1 C6 C7 C8<br>C9                     | 2                    | 4                             | 6           |
| Supervised projects                                                                                                             | B1 B2 B3 B4 B5 B13<br>B15 B14 B16 B6 C1<br>C2 C3 C6 C7 C8 C9<br>C11 | 8                    | 40                            | 48          |
| Personalized attention                                                                                                          |                                                                     | 4.5                  | 0                             | 4.5         |
| (*)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  | Exposición oral complementada co uso de medios audiovisuales e a introdución dalgunhas preguntas dirixidas aos estudantes, coa finalidade de transmitir coñecementos e facilitar a aprendizaxe                                                                                                                 |
| Laboratory practice             | Metodoloxía que permite que os estudantes aprendan efectivamente a través da realización de actividades de carácter práctico, tales como demostracións, exercicios, experimentos e investigacións                                                                                                              |
| Mixed objective/subjective test | Proba que integra preguntas tipo de probas de ensaio e preguntas tipo de probas obxectivas. En canto ás primeiras, recolle preguntas abertas de desenvolvemento, as segundas poden combinar preguntas de resposta múltiple, de ordenación, de resposta breve, de discriminación, de completar e de asociación. |



|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| Supervised projects | Metodoloxía deseñada para promover a aprendizaxe autónoma dos estudantes, baixo tutélaa do profesor e en escenarios variados (académicos e profesionais). Está referida prioritariamente á aprendizaxe do "como facer as cousas",. Constitúe unha opción baseada na asunción polos estudantes da responsabilidade pola súa propia aprendizaxe. Este sistema de ensino baséase en dous elementos básicos: a aprendizaxe independente dos estudantes e o seguimento desa aprendizaxe polo profesor tutor. |
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| Personalized attention         |                                                                                                                                                                                      |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Methodologies                  | Description                                                                                                                                                                          |
| Guest lecture / keynote speech | Aclaración de dúbidas que xurdan despois das sesións maxistrais e fundamentalmente explicacións, comentarios, resolución de dúbidas que xurdan durante o desenvolvemento das clases. |
| Laboratory practice            |                                                                                                                                                                                      |
| Supervised projects            | Non se acepta dispensa académica.                                                                                                                                                    |

| Assessment                      |                                                            |                                               |               |
|---------------------------------|------------------------------------------------------------|-----------------------------------------------|---------------|
| Methodologies                   | Competencies                                               | Description                                   | Qualification |
| Laboratory practice             | B2 B3 B4 B13 C1 C2 C3 C11                                  | Prácticas de laboratorio.                     | 10            |
| Supervised projects             | B1 B2 B3 B4 B5 B13 B15 B14 B16 B6 C1 C2 C3 C6 C7 C8 C9 C11 | Traballos tutelados (individuais ou en grupo) | 50            |
| Mixed objective/subjective test | B1 B2 B3 B4 B13 B15 B14 B6 C1 C6 C7 C8 C9                  | Proba mixta (por escrito)                     | 40            |

| Assessment comments             |
|---------------------------------|
| Academic waiver is not accepted |

| Sources of information |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic                  | Apuntes e documentación facilitada na clase ou a través de Moodle ou a plataforma de Microsoft da UDC.                                                                                                                                                                                                                                                                                                                                                                         |
| Complementary          | 1. Tadmor Z, Gogos CG. Principles of polymer processing. 2. ed. Hoboken: Wiley; 2006.<br /> 2. Agassant J-F. Polymer processing: principles and modeling. 2nd edition. Munich?: Cincinnati: Hanser Publishers?; Hanser Publications; 2017.1. Tadmor Z, Gogos CG. Principles of polymer processing. 2. ed. Hoboken: Wiley; 2006. 2. Agassant J-F. Polymer processing: principles and modeling. 2nd edition. Munich?: Cincinnati: Hanser Publishers?; Hanser Publications; 2017. |

| Recommendations                                          |
|----------------------------------------------------------|
| 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":&nbsp;A entrega dos traballos documentais que se realicen nesta materia:&nbsp;? Solicitaranse en formato virtual e/ou soporte informático&nbsp;? Realizarase a través de Moodle, en formato dixital sen necesidade de imprimilos&nbsp;? En caso de ser necesario realízalos en papel:- Non se empregarán plásticos&nbsp;- Realizaranse impresións a dobre cara.&nbsp;- Empregarase papel reciclado.&nbsp;- Evitarase a impresión de borradores.Débese de facer un uso sustentable dos recursos e a prevención de impactos negativos sobre o medio natural&nbsp;

**(\*)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.**