

LEARNING MODULE DESCRIPTION

GENERAL INFORMATION

1. Module title: **Encapsulation technology**
2. Module code: **MICA**
3. Term: **3rd semester**
4. Duration: **15h**
5. ECTS: **2**
6. Module lecturer: **prof. Bartosz Tylkowski**
7. E-mail: **bartosz.tylkowski@urv.cat**
8. Language: **English**

DETAILED INFORMATION

According to *Science*, encapsulation technology, developed approximately 65 years ago, is defined as a major interdisciplinary research technology. Encapsulation is being used to deliver everything from advanced drugs to unique consumer sensory experiences. It's rapidly becoming one of the most important opportunities for expanding brand potential. Recent advances in polymer science and inorganic chemistry have further enhanced this growth. The monograph aims to review the art of encapsulation and to provide the students with a comprehensive and in-depth understanding of recent developments and innovative applications of this leading-edge technology. During the monograph the teacher will transfer to the audience his know-how gained during ca. 8 years of collaboration with industry concerning the encapsulation technologies.

READING LIST

1. B. Tylkowski*, A. Trojanowska, M. Giamberini, I. Tsibranska, M. Nowak, Ł. Marciniak, R. Jastrzab, Microencapsulation in food chemistry, Journal of membrane science & research, DOI: 10.22079/jmsr.2017.23652, in press.
2. J. Smets, S. Fernandez Prieto, S. D. Smith, T. L. Underiner, J. A. Wos, W.E. Huhn, H. A. Frederick, M. Giamberini, B. Tylkowski, Japanese Granted Patent JP5948417
3. M. Giamberini, S. Fernandez-Prieto, B. Tylkowski, Microencapsulation. Innovative Applications, 2015, Verlag Walter de Gruyter & Co., Berlin, Germany ISBN 978-3-11-033187-5
4. A. Trojanowska*, A. Nogalska, R. Garcia Valls, M. Giamberini, B. Tylkowski, Technological solutions for encapsulation, in Polymer Engineering, Eds. B. Tylkowski, K. Wieszczycka, G. Palumbo, R. Jastrzab, Walter de Gruyter GmbH, 2017, ISBN: 978-3-11-046974-5, in press

SYLLABUS:

Lecture

- Issue 1: Introduction to membrane technology
Issue 2: From membrane to microcapsules shell

- Issue 3: Microcapsules preparation methods – Part 1
- Issue 4: Microcapsules preparation methods – Part 2
- Issue 5: Capsules characterization – techniques
- Issue 6: Polymer chemistry in encapsulation
- Issue 7: Encapsulation & textile technology
- Issue 8: Encapsulation & cosmetics
- Issue 9: Encapsulation & consumer goods
- Issue 10: Encapsulation & pharma/medicine
- Issue 11: Encapsulation & food chemistry
- Issue 12: Photo-stimuli capsules
- Issue 13: Si-based capsules
- Issue 14: pH – triggered capsules
- Issue 15: Future of encapsulation technologies

Student workload (ECTS credits)

| Activity types | Mean number of hours* spent on each activity type |
|--|---|
| Contact hours with the teacher as specified in the programme | 15 |
| Independent study (1) | 15 |
| Independent study (2) | 15 |
| Total hours | 45 |
| Total ECTS credits for the module | 2 |

* Class hours – 1 hour means 45 minutes

(1) Independent study – examples of activity types: preparation for classes, data analysis,

(2) library-based work, PowerPoint presentation of the chosen topic related to the lecture.