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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------|--|--|--|--|--|---------------------------------------------------------------------------------|--|--|-----------------------------------------------------------|--|--|
| Summer Semester                                                                                                                                                                                                                                                                                                                                                        |                                  |                                                                                                |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| Direct (contact) education                                                                                                                                                                                                                                                                                                                                             |                                  |                                                                                                |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| Online learning (synchronous)                                                                                                                                                                                                                                                                                                                                          |                                  |                                                                                                |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| Online learning (asynchronous)                                                                                                                                                                                                                                                                                                                                         |                                  | 30                                                                                             |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| TOTAL per year:                                                                                                                                                                                                                                                                                                                                                        |                                  |                                                                                                |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| Direct (contact) education                                                                                                                                                                                                                                                                                                                                             |                                  |                                                                                                |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| Online learning (synchronous)                                                                                                                                                                                                                                                                                                                                          |                                  |                                                                                                |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| Online learning (asynchronous)                                                                                                                                                                                                                                                                                                                                         |                                  | 30                                                                                             |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| Educational objectives (max. 6 items)                                                                                                                                                                                                                                                                                                                                  |                                  |                                                                                                |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| <p><b>C 1.</b> Transfer of knowledge in the field of diagnostic and therapeutic procedures.</p> <p><b>C 2.</b> Get to know the latest methods and techniques of physiotherapy treatment.</p> <p><b>C 3.</b> Get to know the practical application of methods of physiotherapy.</p> <p><b>C 4.</b> Shaping the appropriate ethical and proper communication skills.</p> |                                  |                                                                                                |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| Education result matrix for module/course in relation to verification methods of the intended education result and the type of class                                                                                                                                                                                                                                   |                                  |                                                                                                |  |  |  |  |  |                                                                                 |  |  |                                                           |  |  |
| Number of course education result                                                                                                                                                                                                                                                                                                                                      | Number of major education result | Student who completes the module/course knows/is able to                                       |  |  |  |  |  | Methods of verification of intended education results (forming and summarising) |  |  | Form of didactic class<br><i>**enter the abbreviation</i> |  |  |
| <b>W 01</b>                                                                                                                                                                                                                                                                                                                                                            | <b>CW 26</b>                     | Knows and describes the concept: biomaterial, biocompatibility, implants hemocompatibility.    |  |  |  |  |  | Say oral presentation during the discussion and multimedia.                     |  |  | SE                                                        |  |  |
| <b>W 02</b>                                                                                                                                                                                                                                                                                                                                                            | <b>CW 26</b>                     | Describes and characterizes the group of biomaterials used in medicine and dentistry.          |  |  |  |  |  | Say oral presentation during the discussion and multimedia.                     |  |  | SE                                                        |  |  |
| <b>W 03</b>                                                                                                                                                                                                                                                                                                                                                            | <b>CW 26</b>                     | Indicates the physico-chemical and biological properties of individual groups of biomaterials. |  |  |  |  |  | Say oral presentation during the discussion and multimedia.                     |  |  | SE                                                        |  |  |
| <b>W 04</b>                                                                                                                                                                                                                                                                                                                                                            | <b>CW 26</b>                     | Describes and explains the methods research aimed at determine the biocompatibility            |  |  |  |  |  | Say oral presentation during the                                                |  |  | SE                                                        |  |  |



|             |              |                                                                                                      |                                                                                                                   |    |
|-------------|--------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----|
|             |              | biomaterials and articles medical, define the concept of in vitro and in vivo.                       | discussion and multimedia.                                                                                        |    |
| <b>W 05</b> | <b>CW 27</b> | Defines the properties of the adhesive coatings on dental implants and active biodressings.          | Say oral presentation during the discussion and multimedia written test, multiple choice test.                    | SE |
| <b>W 06</b> | <b>CW 29</b> | Knows the degradation mechanisms of dental biomaterials.                                             | Say oral presentation during the discussion and multimedia written test, multiple choice test.                    | SE |
| <b>W 07</b> | <b>CW 29</b> | Knows the corrosion process in the mouth and its effect on tissue.                                   | Say oral presentation during the discussion and multimedia written test, multiple choice test.                    | SE |
| <b>U 01</b> | <b>CU 11</b> | Selects a prosthetic materials based on their physicochemical properties and their effect on tissue. | Checking the terminology used in dentistry experimental.                                                          | SE |
| <b>U 02</b> | <b>CU 11</b> | Selects the reproductive material having a biological response to the implant.                       | Check ability to select research methodology by evaluation of biomaterials written test, the test multiple choice | SE |
| <b>K 01</b> |              | Actively participates in the process of creating a presentation on a given topic –                   | Observation work group                                                                                            | SE |



|             |  |                                                                                      |                              |    |
|-------------|--|--------------------------------------------------------------------------------------|------------------------------|----|
|             |  | multimedia.                                                                          |                              |    |
| <b>K 02</b> |  | Accepts work in a team and working together in a group in the creation of instances. | Behavior towards colleagues. | SE |
| <b>K 03</b> |  | Actively participate in the discussion.                                              | Behavior towards colleagues. | SE |
| <b>K 04</b> |  | Integrates with the group and accepted standards of ethical behavior.                | Behavior towards colleagues. | SE |

\*\* L - lecture; SE - seminar; AC – auditorium classes; MC – major classes (non-clinical); CC – clinical classes; LC – laboratory classes; SCM – specialist classes (magister studies); CSC – classes in simulated conditions; FLC – foreign language course; PCP practical classes with patient; PE – physical education (obligatory); VP – vocational practice; SS – self-study, EL – E-learning .

Please mark on scale 1-5 how the above effects place your classes in the following categories:

communication of knowledge, skills or forming attitudes:

Knowledge: 3

Skills: 3

Social competences: 3

**Student's amount of work (balance of ECTS points)**

| Student's workload<br>(class participation, activity, preparation, etc.) | Student Workload (h) |
|--------------------------------------------------------------------------|----------------------|
| 1. Contact hours:                                                        | -                    |
| 2. Online learning hours (e-learning):                                   | 30 h                 |
| 3. Student's own work (self-study):                                      | 5 h                  |
| Total student's workload                                                 | 35 h                 |
| <b>ECTS points for module/course</b>                                     | 1,5                  |
| Comments                                                                 |                      |

**Content of classes** (please enter topic words of specific classes divided into their didactic form and remember how it is translated to intended educational effects)

**Lectures**

- 1.
- 2.
- 3.

**Seminars**

1. Basic concepts and definitions of the biomaterials.
2. Division of biomaterials for different groups based on their physico-mechanical and biological.
3. Biomaterials in dentistry.
4. A comprehensive assessment of the biological part I - evaluation in vitro, in vivo.
5. Alternative test methods.



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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>6. Active biodressings, coatings on implants.</p> <p>7. Phenomena interfacial adhesion phenomenon.6. Review of methods and rehabilitation techniques used outside the dental office.</p> <p>8. Basic safety rules when conducting physical treatments.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>Practical classes</b></p> <p>1.</p> <p>2.</p> <p>3.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>Other</b></p> <p>1.</p> <p>2.</p> <p>3.</p> <p><i>etc. ...</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>Basic literature</b></p> <p>1. Ratner B. D., Hoffman A. S., Schoen F. J., Lemons J. E.: Biomaterials Science. Elsevier, California 2004</p> <p>2. Park, Joon, Lakes, R. S.: Biomaterials An Introduction. 2007</p> <p><b>Additional literature and other materials</b></p> <p>1. Puleo, David A., Bizios, Rena:Biological Interactions on Materials Surfaces, Understanding and Controlling Protein, Cell, and Tissue Responses. 2009,</p> <p>2. Moriarty, Fintan, Zaat, Sebastian A.J., Busscher, Henk J.: Biomaterials Associated Infection Immunological Aspects and Antimicrobial Strategies 2013,</p> <p>3. Burdick, Jason A., Mauck, Robert L.: Biomaterials for Tissue Engineering Applications A Review of the Past and Future Trends. 2011.</p> |
| <p><b>Didactic resources requirements</b> (e.g. laboratory, multimedia projector, other...)</p> <p>multimedia projector, screen, charts teaching</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p><b>Preliminary conditions</b> (minimum requirements to be met by the student before starting the module/course)</p> <p>basic knowledge of physiology and pathology and human anatomy</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>Conditions to receive credit for the course</b> (specify the form and conditions of receiving credit for classes included in the module/course, admission terms to final theoretical or practical examination, its form and requirements to be met by the student to pass it and criteria for specific grades)</p> <p>- student's activity during classes, one choice test, passing minutes after reaching 60% of the points</p>                                                                                                                                                                                                                                                                                                                         |

| <b>Grade:</b>      | <b>Criteria</b> (only for courses/modules ending with an examination) |
|--------------------|-----------------------------------------------------------------------|
| Very Good<br>(5.0) |                                                                       |
| Good Plus          |                                                                       |



|                            |                                                                 |
|----------------------------|-----------------------------------------------------------------|
| (4.5)                      |                                                                 |
| Good<br>(4.0)              |                                                                 |
| Satisfactory Plus<br>(3.5) |                                                                 |
| Satisfactory<br>(3.0)      |                                                                 |
|                            | <b>Criteria (only for courses/modules ending with e credit)</b> |
| Credit                     |                                                                 |

|                            |                                                                                                                                                                                                                                                               |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Grade:</b>              | <b>Criteria (examination evaluation criteria)</b>                                                                                                                                                                                                             |
| Very Good<br>(5.0)         |                                                                                                                                                                                                                                                               |
| Good Plus<br>(4.5)         |                                                                                                                                                                                                                                                               |
| Good<br>(4.0)              |                                                                                                                                                                                                                                                               |
| Satisfactory Plus<br>(3.5) |                                                                                                                                                                                                                                                               |
| Satisfactory<br>(3.0)      |                                                                                                                                                                                                                                                               |
| Unit realizing the subject | Department of Experimental Surgery and Biomaterials Research                                                                                                                                                                                                  |
| Unit address               | 50-368 Wrocław, 44 Bujwida Str.                                                                                                                                                                                                                               |
| Telephone                  | 71/7840131 (135,132)                                                                                                                                                                                                                                          |
| E-Mail                     | <a href="mailto:zbigniew.rybak@umed.wroc.pl">zbigniew.rybak@umed.wroc.pl</a> , <a href="mailto:maria.szymonowicz@umed.wroc.pl">maria.szymonowicz@umed.wroc.pl</a> ,<br><a href="mailto:magdalena.ostrowska@umed.wroc.pl">magdalena.ostrowska@umed.wroc.pl</a> |

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|-------------------------------|------------------------------------------------------------------------------|
| Person responsible for module | Prof. dr hab. Zbigniew Rybak                                                 |
| Coordinator                   | Prof. dr hab. Zbigniew Rybak                                                 |
| Telephone                     | 71/7840131                                                                   |
| E-Mail                        | <a href="mailto:zbigniew.rybak@umed.wroc.pl">zbigniew.rybak@umed.wroc.pl</a> |

| List of persons conducting specific classes |                                         |                 |                      |                 |
|---------------------------------------------|-----------------------------------------|-----------------|----------------------|-----------------|
| Full name                                   | Degree/scientific or professional title | Discipline      | Performed profession | Form of classes |
| Zbigniew Rybak                              | Prof. dr hab.                           | Medical science | Surgeon              | SE              |
| Wojciech Zakrzewski                         | lek. dent.                              | Medical science | PhD student          | SE              |



**Date of Syllabus development**

**Syllabus developed by**

29.09.2020 r.

Dr n. med. Maria Szymonowicz

**Signature of Head of teaching unit**

Prof. dr hab. Zbigniew Rybak

Signature of Faculty Dean

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