COURSE DESCRIPTION

SUBJECT: BIOMATERIALS
YEAR: 2ND / SEMESTRAL COURSE
DEGREE: DENTISTRY
MODALITY: ATTENDANCE IS REQUIRED
ACADEMIC YEAR: 2016/2017
FACULTY OF MEDICINE
1. COURSE/SUBJECT IDENTIFICATION

1.- SUBJECT:

Name: DENTISTRY BIOMATERIALS  
Code: b222  
Year (s) course is taught: 2º  
Type: Core Subject  
ECTS of the course: 30  
Language: English  
Modality: Attendance required on campus  
Degree(s) in which the course is taught: Dentistry  
School in which the course is taught: Medicine

2.- ORGANIZATION OF THE COURSE:

Department: Dentistry  
Area of knowledge: Stomatology

2. LECTURERS OF THE COURSE/SUBJECT

1.-LECTURERES:

Responsible of the Course  
Name: CESAR MUELAS SANCHEZ  
Phone (ext): 902089600  
Email: Cesar.muelassanchez@ceu.es  
Office: 203  
Teaching and Research profile  
Research Lines

Lecturer(s)  
Name: CARLOS QUINTANA RAYO  
Phone (ext): 902089600  
Email: Carlos.quintanarayo@ceu.es  
Office: 203

Lecturer(s)  
Name: ANA ADELL PÉREZ  
Phone (ext):  
Email: Ana.adellperez@ceu.es  
Office:
2.- TUTORIALS:

For any queries students can contact lecturers by e-mail, phone or visiting their office during the teacher’s tutorial times published on the students’ Virtual Campus.

3. COURSE DESCRIPTION

In biomaterials subject a description of the different biomaterials used in dentistry for dental restorations, as the reproduction of teeth is performed.
4. COMPETENCIES

1.- COMPETENCIES

<table>
<thead>
<tr>
<th>Code</th>
<th>Basic and General Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG.13</td>
<td>Understand and recognize the sciences of the essential biomaterials for the dentistry practice as the immediate control of the possible allergic reactions of themselves</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Specific Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE.11</td>
<td>Manage and choose the suitable materials and tools for dentistry</td>
</tr>
<tr>
<td>CE.12</td>
<td>Dental biomaterial knowledge. Its manipulation, properties, indications, allergies, biocompatibility, toxicity, waste disposal and environmental impact</td>
</tr>
</tbody>
</table>

2.- LEARNING OUTCOMES:

<table>
<thead>
<tr>
<th>Code</th>
<th>Learning outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Facilitate to the dentistry students the knowledge of different biomaterials used in dental restorations, as the reproduction of teeth to perform unitary, partial or complete prosthesis.</td>
</tr>
<tr>
<td></td>
<td>• General concepts of different biomaterials used in dental restorations.</td>
</tr>
<tr>
<td></td>
<td>• Composition, properties and clinical applications of dentistry biomaterials and how they interact with each other and with the biological environment.</td>
</tr>
<tr>
<td></td>
<td>• Learning of the theoretical bases that allow to scientifically predict the behavior of new biomaterials</td>
</tr>
</tbody>
</table>

5. LEARNING ACTIVITIES

1.- DISTRIBUTION OF STUDENTS’ ASSIGNMENT:

<table>
<thead>
<tr>
<th>Total hours of the course</th>
<th>180</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>On-campus hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theoretical Classes</td>
<td>30H</td>
</tr>
<tr>
<td></td>
<td>Practice/seminary classes</td>
<td>15H</td>
</tr>
<tr>
<td></td>
<td>Laboratory Practice</td>
<td>15H</td>
</tr>
<tr>
<td></td>
<td>TOTAL Presence Hours</td>
<td>60H</td>
</tr>
</tbody>
</table>
Course Description / Academic year 2016-2017

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Not on-campus hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self student work</td>
<td>120H</td>
</tr>
</tbody>
</table>

2.- DESCRIPTION OF LEARNING ACTIVITIES:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>Learning activity oriented preferably to the competence of acquisition of knowledge and representative of more theoretical subjects. This activity gives priority to the transmission of knowledge by the professor, with the previous preparation or later study from the student.</td>
</tr>
<tr>
<td>Classes-Seminars</td>
<td>Practical seminars will be taught following the course syllabus, with the active participation of students. They are used instructional support materials</td>
</tr>
<tr>
<td>Practical Classroom</td>
<td>The practical classes will be developed in the labs sessions of 2 hours per day, spread throughout the semester.</td>
</tr>
</tbody>
</table>

6. ASSESSMENT OF LEARNING

1.- CLASS ATTENDANCE:

- In order to be eligible for examination by continuous assessment students must attend at least 75% of scheduled class time (attendance sheets will be used). As students may be absent 25% of the classes, no attenuating circumstances will be accepted for absences.
- 100% attendance at practical classes is required. Not assisting the practices in the programmed schedule will carry the failure of both convocations (ordinary and extraordinary)

2.- ASSESSMENT SYSTEM AND CRITERIA:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Written evaluation</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>Practice evaluation</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Continuous evaluation</td>
<td>10%</td>
</tr>
</tbody>
</table>

EXTRAORDINARY EXAMINATION

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Written evaluation</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td>Practice evaluation</td>
<td>20%</td>
</tr>
</tbody>
</table>
3.- DESCRIPTION OF ASSESSMENT CRITERIA:

<table>
<thead>
<tr>
<th>Assessment criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Written</strong></td>
<td>• All students will take a final exam compilation (ordinary examination). This test will consist of a compilation of 50-question multiple choice test. The mark required to pass is equal to or greater than 5, taking 5 in the test with 35 right questions.</td>
</tr>
</tbody>
</table>
| **Practice**        | A final practice examination will be performed in the laboratory where the student performs a random procedure chosen among all practice that they have done during the course.  
• For each practice the students must download the practices guidelines where the procedure is described and the material needed for the execution is specified.  
• The student will study the theory related to the practice before attending it. The teacher may perform a theory test at the beginning of the practice and indicate the work to carry out. The work done on the day will be evaluated at the end of the practice. |

7. COURSE PROGRAMME

1.- COURSE PROGRAMME:

**THEORETICAL:**

Theoretical program:

1- Dentistry biomaterials structure (obm).
2- Physical, chemical, mechanical, optical, thermal and electrical properties (i)
3- Physical, chemical, mechanical, optical, thermal and electrical properties (ii)
4- Material’s behavior in the biological environment; biocompatibility
6- Plasters for dental purposes
7- Dental amalgam.
8- Acrylic resins
9- Compound resins or composites
10- Bonding in dentistry.
11- Dental cements (i): glass ionomer cements and hybrids.
12- Dental cements (ii): Calcium hydroxide
14- Dental cements (iv): zinc oxide eugenol.
15- Material for implants: Titanium. Suture
16- Bone graft and tissue regeneration materials.
17- Fixing malocclusions materials.
18- Root treatment materials in Dentistry.

PRACTICAL WORK PROGRAMME:

Practice nº 1
1-Hydrocolloids: Alginate dosage and management. Impression on toothed model
2- Plaster: Dosage and plaster management. Mix, shake and shape. Study model’s preparations.

Practice nº 2
1-Basboared the obtained plaster models
2- Obtain split bases through the models

Practice nº 3
1-Polymers in dentistry. Elastomers: polysulfurs and silicone (condensation and addition). Polyethers.
2-Bite and occlusion registration wax. Bite registration and occlusion over the toothed models.

Practice nº 4
1–Acrylic resins: Develop preclinical training models. Make cavities on natural teeth.

Practice nº 5
-Composites and composed acrylic.
-Amalgam
-Finishing and polishing

Practice nº 6
1-Acrylic Resins: Making provisional crowns 1st part: First step.

Practice nº 7
1-Acrylic Resins: Making provisional crowns 2nd part

Practice nº 8
- Dental cements for provisional and final luting of crowns and bridges (resin) or definitives (metal, metal-ceramic, ceramic).
- Endodontic materials: Cements, paper points and gutta percha
### MATERIAL THAT STUDENTS MUST BRING TO CARRY OUT THE PRACTICE:

- White dressing grown.
- Laboratory notebook.
- Rotatory instruments: turbine, Handpiece and contrangle.
- 1 tiling or square tiles of 30cm x 30 cm.
- 1 Small duralex glass, expulsive width walls with round and smooth base.
- 1 Alginate cup.
- 1 Plaster cup.
- 1 Spatula for whipping alginate.
- 1 Spatula for whipping plaster.
- 1 Wax spatula.
- Fine sandpaper.
- 1 Endodontic finger spreader.
- 1 Box stocked of endodontic files (number 15 to 40).
- Black permanent marker.
- Red permanent marker.
- Middle size rectangular tupper-ware.
- 1 Safety glasses.
- 1 Neutral Vaseline.
- 1 roll of 2 cm wide duct tape.
- 1 Millimeter ruler of 30 cm.
- 1 Spontex baize.
- 1 Cement spatula.
- 1 steel handpiece’s burs.
- 1 Spheric width tungsten handpiece’s burs.
- 1 box burs with turbine’s burs and contrangle’s burs (Komet).
- 1 Dental mirror.
- 1 Explorer.
- 1 dental tweezers.
- 1 plastic filling instrument for composite.
- 1 Amalgam pluggage.
- 1 Amalgam carrier.
- 1 Dappen glass.
- 1 Amalgam burnisher
- 1 Hollenback (Cleoide discoide).
- 2 gum baseboard.
- 1 black spoon
- 1 Alcohol burner
- Natural teeth: 2 incisors, 1 canine, 2 premolars and 3 molars.

8. RECOMMENDED READING

1.- ESSENTIAL BIBLIOGRAPHY:

- Dental Materials and Their Selection. O'Brien, William J.
- Phillip's science of dental materials. Anusavice, Kenneth J.

2.- ADDITIONAL BIBLIOGRAPHY:

- Dental biomaterials: imaging, testing and modelling. Curtis, Richard, Watson, Timothy F.

4.- WEB RESOURCES :

- Pubmed-Medline

9. ATTITUDE IN THE CLASSROOM

1.- REGULATIONS

Any irregular act of academic integrity (no reference to cited sources, plagiarism of work or inappropriate use of prohibited information during examinations) or signing the attendance sheet for fellow students not present in class will result in the student not being eligible for continuous assessment and possibly being penalized per the University regulations.

The use of electronic devices is not permitted during classes, both theoretical and practical, nor during evaluations.

It is restricted the use of the documentation provided by the teacher through the student portal (presentations, seminars, notebooks practices, etc.) to the preparation of the subject. The teachers the right to make use of the measures contained in the legislation on Intellectual Property, in cases where use and / or unauthorized disclosure of such material is detected reserved.