**3D-technology in the diagnosis and treatment of dental diseases**

**(108 hours / 3 credits)**

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and by appointment

COURSE OBJECTIVE:

preparation of a dentist who is able to provide patients with quality outpatient dental care for pathologies of hard tooth tissues and dentition defects, introducing the latest achievements (innovations) in dental science into their therapeutic activities.

COURSE OUTCOMES:

* ability to abstract thinking, analysis, synthesis;
* solving of standard tasks in professional activity with use of information, bibliographic resources, biological terminology, information and communication technologies;
* readiness for gathering and analysis of patient complaints, data of his anamnesis, results of examination, laboratory, instrumental and other studies to identify the condition or establish the fact presence or absence of a dental disease;
* ability to determine the main pathological states, symptoms, syndromes of dental diseases, nosological forms in accordance with the International Statistical Classification of Diseases;
* readiness for analysis and public presentation of medical information based on evidence-based medicine.

METHODOLOGY:

* Lectures and the presentation of visual materials (slides, videos);
* Readings and in-class discussions.

COURSE REQUIREMENTS:

The current control of the mastery of the subject is determined by an verbal survey in the classroom and the solution of the test tasks.

At the end of the discipline, students pass the exam. Practical skills are assessed and recorded in the journal of practical skills. The knowledge obtained during the period of studying the discipline is checked by means of intermediate test control and discussion.

GRADING: Grading is based on individual progress. That progress will be based on the following:

semester rating 30%

manual skills 10%

intermediate computer control 20%

exam 40%

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| Grades | Points |
| 2 | 0-54 |
| 3 (passed) | 55 – 69 |
| 4 | 70 – 84 |
| 5 | 85 - 100 |

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| №№ | Topic | Type of Class | Hours | Tests/Essays |
| 1. | Basic information on the method of making structures using CAD / CAM systems. Possibilities of modern CAD / CAM systems (production of inlays, crowns, veneers, bridges, implant abutments, attachments, clasp prostheses). Methods of making structures using CAD / CAM systems (milling, laser sintering, slip technology). | practice | 2,5 | discussion |
| 2. | Comparison of CAD-CAM systems for laboratory fabrication of structures and cabinet systems. Overview of materials for the manufacture of structures using CAD-CAM systems. | practice | 2,5 | incoming written control |
| 3. | History of the development of CEREC-technology. Familiarization with the user interface of the CEREC 3D system. On-screen toolbars. Menu. Dental database. Functions of the 3D model. Tools for construction. The "Design" window. Tools Edit, Scale, Form, Drop, Shape, Cut. Circular scaling. Positioning and rotation. | practice | 2,5 | quiz |
| 4. | The choice of the type of orthopedic construction and material for its manufacture using the CEREC 3D system, depending on the clinical situation. The choice of design, depending on the defect of the crown part of the tooth or tooth row. | practice | 2,5 | quiz |
| 5. | Structural materials used for making restorations with the help of CEREC 3D and In lab systems. Indications for the use of various standard blocks for grinding, depending on their physical and mechanical properties. | practice | 2,5 | discussion |
| 6. | Modern technologies of preparation of hard tissues of teeth. Requirements for the preparation of the teeth under the tabs with the subsequent manufacture of CAD-CAM restorations. Technologies and rules for obtaining an optical impression from the patient's dental rows. | practice | 2,5 | practical skills |
| 7. | Designing a tab in the "Dental Database" mode. Enter administrative data. 3D model. Input of structural elements. Storing of the structure. Approximal contact. Completion of work on the structure. | practice | 2,5 | practical skills |
| 8. | Crown design in the "Dental Database" mode. Enter administrative data. Align the 3D model. Edit the lines. Scaling the surface. Approximal contact. Use the "Shape" tool. | practice | 2,5 | quiz |
| 9. | Crown design in the "Correlation" mode. Enter administrative data. Obtaining an optical impression. 3D model. Equator line. Copy line. Proposed restoration. Approximal contacts. | practice | 2,5 | quiz |
| 10. | Crown design with buccal and occlusion registries. Registry of central occlusion. Shooting of the prepared tooth. Clipping of the bite register. Definition of approximal contacts. Selection from the dental database. Automatic fit. Manual adjustment. | practice | 2,5 | discussion / quiz |
| 11. | Crown design in the "Replication" mode. Enter administrative data. Shooting of the prepared tooth. Replicative photography. Output of mirroring of the copying line, positioning. Approximal contact. Correction of the shape of the crown. Simultaneous restoration of several teeth. | practice | 2,5 | discussion |
| 12. | Preview before grinding. Grinding mode. Location is asleep. The value of the threshold thickness of the restoration. Visualization of a block of a polychrome block. The process of grinding. | practice | 2,5 | discussion |
| 13. | Polishing or glazing of CEREC-restorations. Individualization of all-ceramic restorations with the help of ceramic masses and paints. | practice | 2,5 | practical skills |
| 14. | Adhesive fixation of CEREC-restorations. Cements of double curing. Representatives, their properties and differences. Stages of fixation of various all-ceramic CEREC-restorations. | practice | 2,5 | discussion |
| 15. | CEREC 3D system. Its place among CAD / CAM technologies. Indications and contraindications for the manufacture of CEREC-restorations. Stages of their manufacture. | practice | 2,5 | discussion |
| 16. | Features of the model for scanning in the device inEOS, gypsum models in the articulator. Obtaining an optical impression in the device inEOS. | practice | 2,5 | discussion |
| 17. | Demonstration and self-simulation of veneers. Working with the dental database and various ways of modeling tabs (replication, correlation, articulation) | practice | 2,5 | practical skills |
| 18. | Demonstration and independent modeling of bridges and skeletons of bridges. Working with the dental database and various ways of modeling tabs (replication, correlation, articulation) |  | 2,5 | practical skills |
| 19. | 3D-technology. Modeling in implantology.Methods of manufacturing and modeling of removable dentures in the CAD / CAM system.  |  | 2,5 | discussion |
| 20. | Three-dimensional technologies in X-ray diagnostics |  | 2,5 | discussion |
| 21. | Final lesson |  | 1 | exam |

Personal requirements for the course: attendance, homework, coming late, medical robe.