Uzhhorod National University

Faculty of Dentistry

Department of Fundamental Medical Disciplines and

Orthopedic Dentistry

"**APPROVE**"

Dean of the Faculty of Dentistry

Doctor of Medical Sciences, Prof. Kostenko Ye.Ya.

"\_\_" \_\_\_\_\_\_\_2022

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## WORK PROGRAM OF THE DISCIPLINE

**DENTAL RADIOLOGY**

(code and name of the discipline)

Knowledge area 22 Healthcare

(cipher and name of the direction of training)

specialty 221 DENTISTRY

(cipher and name of the specialty)

Specialization DENTISTRY

(name of specialization)

Institute, Faculty, Department of Uzhhorod National University, Faculty of Dentistry, full-time faculty.

(name of institute, faculty, department)

Uzhhorod – 2022

Working program on "Dental Radiology" for students of the III - th year

(name of the discipline)

dental faculty in the field of knowledge "22 Health care", specialty "221 Dentistry" – 20 s.

"\_\_" \_\_\_\_\_\_\_\_ 2022

Developers:

Kostenko Svitlana Borysivna - Doctor of Medicine, Associate Professor, Associate Professor of the Department of Fundamental Medical Disciplines and Orthopedic Dentistry;

Gurando Vyacheslav Radomyrovych – Candidate of Medical Sciences, Associate Professor, Associate Professor of the Department of Fundamental Medical Disciplines and Orthopedic Dentistry;

Serhiy Ivanovych Krichfalushiy – assistant, assistant of the Department of Fundamental Medical Disciplines and Orthopedic Dentistry;

Mykola Boichuk – assistant, assistant of the Department of Fundamental Medical Disciplines and Orthopedic Dentistry;

The work program was approved at a meeting of the Department of Fundamental Medical Disciplines and Orthopedic Dentistry

"\_\_" \_\_\_\_\_\_\_\_ 2022 year No \_\_.

Head of the Department

Doctor of Medicine, Associate Professor

"\_\_" \_\_\_\_\_\_\_\_ 2022 year \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

(signature) (surname and initials)

Approved by the educational and methodical commission of the higher educational institution in the specialty

«221 Dentistry»\_

(cipher, name)

"\_\_" \_\_\_\_\_\_\_\_ 2022 year No \_\_

"\_\_" \_\_\_\_\_\_\_\_\_ 2022 year \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ . (signature) (surname and initials)

# **Description of the discipline**

|  |  |  |  |
| --- | --- | --- | --- |
| Name of indicators | Branch of knowledge,direction of training, educational qualification level | Characteristics of the discipline | |
| **full-time education** |  |
| Number of credits –1.5 | Field of knowledge  22 Healthcare | Normative  (optional) | |
| Direction of training  221 DENTISTRY |
| Modules – 1 | Specialty (n rofefee  cheading):  Dentistry | **Year of preparation:** | |
| Content modules – 3 | 3rd | 3rd |
| Individual research task \_\_\_\_\_\_\_\_\_\_  (title) | **Semester** | |
| Total number of hours - 40 | **5th** | **6th** |
| **Lecture** | |
| Weekly hours for full-time education:  classroom – 30  independent work of the student - 10 | Educational qualification level:  specialist | 10 hours | 0 h. |
| **Practical, seminary** | |
| 20 hours. | 0 h. |
| **Laboratory** | |
| 0h. | 0 h. |
| **Independent work** | |
| 10 hours | 0 h. |
| **Individual tasks:** hours. | |
| Type of control: credit | |

The ratio of the number of hours of classroom classes to independent and individual work is:

for full-time education – 75% : 25%.

1. **The purpose and objectives of the discipline**

**The purpose** of teaching the discipline is to provide knowledge and skills on diagnostics by radiographic methods of the dentition and analysis of radiographic data necessary for the professional activity of a doctor.

**The objectives of** the discipline are:

- Teach students the basic methods of radiological and computed   
tomographic researchni.

-Teach to recognize the main pathological processes according to X-ray examination data.

* Clearly defined in the sequence and the need to obtain a diagnostic image.
* Know the place and role, indications and contraindications to X-ray examinations.

**The student should know:**

* basic principles and requirements for X-ray equipment
* principles of operation of modern diagnostic equipment and the possibility of obtaining a diagnostic image;
* safety precautions when working in the field of ionizing radiation, protection by time, distance and shielding, features of protection during the examination of children;

- analysis of radiographs in pathologies of hard tooth tissues.

* analysis of radiographs in pathologies of bone structures of the dentition.
* analysis of radiographs of joints and nasal sinuses.
* know the principles and objectives of computed tomography in dentistry.
* know the mechanisms of action of ionizing radiation.

**The student must be able to:**

1. Based on the anamnesis and clinical picture of the disease, determine the indications and contraindicationsof the azaleas before radiation examination.
2. Correctly position the patient when performing X-ray examination.
3. Read and analyze orthopantomographic research.
4. Read and analyze computed tomography
5. Organize protection with time, distance and screen for the patient, nurse and the operator himself.
6. Make a referral for X-ray examination.
7. Recognize caries, various forms of chronic periodontitis, periodontitis, fractures of facial bones, radicular and follicular cysts of the face, inflammatory and tumor processes of the maxillofacial area on radiographs.
8. **The program of the discipline**

**Content module 1.**

**Fundamentals of Radiology in Dentistry**

**Topic 1** Radiography in dentistry – methods, tasks, possibilities.

stage of development of diagnostics in dentistry.

**Topic 2**. Physical bases of radiography. X-rays and their production. Origin and properties of X-rays. Structure of the X-ray apparatus. Principles and methods of protection.

**Content module 2. X-ray methods for diagnosing SCHLD**

**Topic 3.** Methods of X-ray diagnostics in dentistry. Digital radiography. Intraoral radiography. Positioning.

**Topic 4.** Zonography. Panoramic radiography. Orthopantomogram – description and analysis.

**Topic 5.** Telerentgenography. Direct and lateral projection of TRG.

**Topic 6.** Computed tomography. Advantages and disadvantages. Opportunities in dentistry. Indications and against indications. Cone-beam CT and spiral CT.

**Content module 3. Practical analysis of X-ray examinations**

**Topic 7.** Use of radiation diagnostics methods in therapeutic dentistry and orthodontics

**Topic 8.** Use of radiation diagnostics methods in orthopedic and surgical dentistry.

**Topic 9.** Digital diagnostic methods in forensic dentistry

**Topic 10.**  Final lesson. Modular control

1. **The structure of the discipline**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Titles of content modules and topics | Number of hours | | | | | | | | | | | |
| full-time | | | | | | | | | | | |
| Just | | | | including | | | | | | | |
| l | See | | lab | | Indus | | s.r |
| 1 | 2 | | | | 3 | 4 | | 5 | | 6 | | 7 |
| **Module 1** | | | | | | | | | | | | |
| **Content module 1**.  **Fundamentals of Radiology in Dentistry** | | | | | | | | | | | | |
| **Topic number 1.**  Radiography in dentistry – methods, tasks, possibilities.  stage of development of diagnostics in dentistry. | | **2** | |  | | | **2** |  |  | | **2** | |
| **Topic number 2.** Physical bases of radiography. X-rays and their production. Origin and properties of X-rays. Structure of the X-ray apparatus. Principles and methods of protection. | | **2** | |  | | | **2** |  |  | | **2** | |
| **Total content module 1.** | | **8** | | **0** | | | **4** |  |  | | **4** | |
| **Content module 2. X-ray methods for diagnosing SCHLD** | | | | | | | | | | | | |
| **Topic number 3.** Methods of X-ray diagnostics in dentistry. Digital radiography. Intraoral radiography. Positioning. | | | 4 |  | | | 2 |  |  | | 2 | |
| **Topic number 4.**  Zonography. Panoramic radiography. Orthopantomogram – description and analysis. | | | 4 |  | | | 2 |  |  | | 2 | |
| **Topic #5.**  Telerentgenography. Direct and lateral projection of TRG. | | | 2 |  | | | 2 |  |  | |  | |
| Topic #6. Computed tomography. Advantages and disadvantages. Opportunities in dentistry. Indications and against indications. Cone-beam CT and spiral CT. | | | 2 |  | | | 2 |  |  | |  | |
| **Total content module 2** | | | **12** |  | | | **8** |  |  | | **4** | |
| **Content module 3. Practical analysis of X-ray examinations** | | | | | | | | | | | | |
| **Topic number7.** Use of radiation diagnostics methods in therapeutic dentistry and orthodontics | | | **3** |  | | | **2** |  |  | | **1** | |
| **Topic #8.** Use of radiation diagnostics methods in orthopedic and surgical dentistry. | | | **3** |  | | | **2** |  |  | | **1** | |
| **Topic #9.** Digital diagnostic methods in forensic dentistry | | | **2** |  | | | **2** |  |  | |  | |
| **Topic 10.**  Final lesson. Modular control | | | **2** |  | | | **2** |  |  | |  | |
| **Total content module 3** | | | **10** | **0** | | | **8** |  |  | | **2** | |
| **Just** | | | **30** | **0** | | | **20** |  |  | | **10** | |

1. **Topics of lectures.**

|  |  |  |
| --- | --- | --- |
| №  s/n | Topic name | Quantity  Hours |
| 1 | The history of the development of X-rays. Puluj radiation . | 2 |
| 2 | Physical basis of radiography. | 2 |
| 3 | Characteristics of methods of radiation diagnostics in the field of dentistry. | 2 |
| 4 | Principles of KPCT diagnostics in dentistry. | 2 |
| 5 | Radiation diagnostic methods in forensic dentistry. | 2 |
|  | **Together** | **10** |

**6. Topics of seminars -** *not provided for by the curriculum.*

**7. Topics of practical classes**

|  |  |  |
| --- | --- | --- |
| №  s/n | Topic name | Quantity  Hours |
| 1 | Radiography in dentistry – methods, tasks, opportunities. The modern stage of development of diagnostics in dentistry. | 2 |
| 2 | Physical basis of radiography. X-rays and their production. The origin and properties of X-rays. The structure of the X-ray apparatus. Principles and methods of protection. | 2 |
| 3 | Methods of X-ray diagnostics in dentistry. Digital radiography. Intraoral radiography. Positioning. | 2 |
| 4 | Zonography. Panoramic radiography. Orthopantomogram – description and analysis. | 2 |
| 5 | Telerentgenography. Direct and bokovaprojection of TRG . | 2 |
| 6 | Computed tomography. Advantages and disadvantages. Opportunities in dentistry. Indications and against indications. Cone-beam CT and spiral CT. | 2 |
| 7 | Use of radiation diagnostics methods in therapeutic dentistry and orthodontics | 2 |
| 8 | Use of radiation diagnostics methods in orthopedic and surgical dentistry. | 2 |
| 9 | Digital diagnostic methods in forensic dentistry | 2 |
| 10 | Final lesson. Modular control | 2 |
|  | Just | 20 |

**8. Topics of laboratory classes -** *not provided for by the curriculum.*

**9. Independent work**

|  |  |  |
| --- | --- | --- |
| №  s/n | Topic name | Quantity  Hours |
| 1 | General and specific methods of X-ray examination. | 2 |
| 2 | Types of X-ray equipment. Options and principles of visualization | 2 |
| 3 | Varieties of intraoral radiographyи. Positioning principles. | 2 |
| 4 | Orthopantomography as a screening method for diagnosing HLD | 2 |
| 5 | Radiation tests as a control of endodontic treatment | 1 |
| 6 | Diagnostic importance of additional research methods. | 1 |
|  | Just | 10 |

**10. List of compulsory practical skills:**

1) on the basis of anamnesis, clinical picture of the disease, the student must determine  
the indications, contraindications and the procedure for applying radiation diagnostic methods  
;

2) correctly put on the negatoscope sighting and orthopantomographic radiographsand.

3) on the radiograph to determine which tooth was examined and for what purpose.

4) on radiographs to show and name the main anatomical formations;

5) describe the changes on radiographs that occur in inflammatory and tumor diseases of the maxillofacial area;

6) recognize on radiographs in 2 projections dislocation and fracture with  
determination of the nature of bone displacement;

7) by comparing the clinical and data methods of radiation diagnostics , recognize the peri-apical pathology, determine the volume of the bone, give a characteristic of the nasal sinuses, determine the nature and peculiarity of the topography of the root canals, as well as characterize the quality of tooth restoration and restoration of the contact point.

8) prepare the patient for X-ray examination.

9) to give interpretation to the existing telerentgenograms in straight and lateral projections.

10) open, read and analyze computed tomography data.

**11. Teaching methods**

Applied methods of activation and intensification of learning

1. Clear definition and justification of the relevance of the topic in all practical classes.
2. Maximum implementation of technical means of training and diagnostics (work in the X-ray room, work with digital media)
3. Solving situational problems.
4. Research work.

3. Solving problematic issues.

**12. Control methods**

Means of conducting current control of students' knowledge

* oral questioning;
* solving situational problems;
* test and written control of the initial level of knowledge;
* description and analysis of intraoral radiographs, orthopantomograms and CT scans.

Means of conducting the final control of knowledge and the form  
of its implementation

* oral questioning;
* decryption of intraoral radiographs, orthopantomograms and CT scans.
* written (or test) control of the main sections of the discipline;
* final lesson;
* differentiated standings.

**13.Distribution of points received by students**

**13.1 Assessment of discipline.**

Forms of control and assessment system are carried out in accordance with the requirements of the discipline program and the Instruction on the system of evaluation of students' educational activities under the credit-modular system of organization of the educational process, approved by the Ministry of Health of Ukraine (2005)

The score for the module is defined as the sum of the assessments of current educational activities (in points) and the assessment of the final module control (in points), which is set when assessing theoretical knowledge and practical skills in accordance with the lists , defined by the program of the discipline.

***The maximum number of points awarded to students when mastering each module (credit) is 200, including for current academic activities – 120 points (60%), according to the results of modular final control – 80 points (40%).***

***Current control*** is carried out at each practical lesson according to specific goals for each topic.

The weight of each topic within the same module is the same. Evaluation of the current educational activities of students is carried out according to the following scheme:

When mastering each topic of the module for current educational activities, the student is given marks from 0 to 10 points for each topic.

0 points – there is no knowledge on the topic of the lesson.

**1 point** – the student shows knowledge and understanding of individual provisions of the educational material.

**2 points** - the student reveals knowledge and understanding of individual provisions of the educational material, his answer is not meaningful, he is able to apply knowledge only when performing tasks according to the model.

**3 points** – the student has partially mastered the content of the educational material, makes mistakes in answering questions. research and indications for its implementation.

**4 points** - the student has partially mastered the content of the educational material, makes mistakes in answering questions. research and indications for its implementation, as well as assess the advantages and disadvantages of certain methods of radiation diagnostics.

**5 points** - the student has partially mastered the content of the educational material, makes mistakes in answering questions. research and indications for its implementation, as well as assess the advantages and disadvantages of certain methods of radiation diagnostics and to a certain extent evaluate the presented symptoms and syndromes pathology of SHCHLD.

**6 points – the** student has satisfactory knowledge within the requirements of the curriculum and consciously uses them in various situations. tell about the research method itself (its advantages and disadvantages), correctly assess and characterize the symptoms and syndromes of the pathology of HLD.

7 **points – the** student has good knowledge within the requirements of the curriculum and consciously uses them in different situations. about the research method itself (its advantages and disadvantages), correctly assess and characterize the symptoms and syndromes of the pathology of HLD.

**8 points** – the student has good knowledge within the requirements of the curriculum, consciously uses them in rziny sutions. He is able to independently analyze, evaluate, summarize the mastered material. and deficiencies), correctly assess and characterize the symptoms and syndromes of the pathology of HLD. Draw conclusions according to pathological changes in the radiological picture.

**9 points** – the student has good knowledge within the requirements of the curriculum, consciously uses them in different situations. He is able to independently analyze, evaluate, summarize the mastered material. Use sources of information, make decisions. He is able to draw reasonable conclusions. and characterize the symptoms and syndromes of the pathology of HLD. Draw conclusions according to pathological changes in the radiological picture.

**10 points - the** student has excellent knowledge within the requirements of the curriculum, consciously uses them in various situations. He is able to independently analyze, evaluate, summarize the mastered material. Use sources of information, make decisions. Able to draw reasonable conclusions. evaluate and characterize the symptoms and syndromes of pathology of HLD. Draw conclusions according to pathological changes in the radiological picture.

A positive assessment on each topic is credited if the student scored 5 or more points.

**The maximum number** **that a**  student **can score when studying a module is 120 points.**

**The minimum number of points** **that a**  student **can score when studying a module is 55 points.**

**13.2 Means of conducting the final control**  of **knowledge and its form.**

***The final module control*** is carried out upon completion of the study of all topics of the module in the last control lesson from the module.

Students who have completed all types of work provided for in the curriculum are allowed to the final control, and when studying the module, they scored a number of points not less than the minimum.

The form of the final modular control is standardized and includes the control of theoretical and practical training. Specific forms of final modular control in dental radiology are determined in the working curriculum.

The final modular control is carried out at the last practical lesson. Each student receives a ticket with 4 questions. Each question is estimated from 0 to 10 points (maximum number of 40 points). Test tasks (10 test tasks of 2 points each) – the maximum number is 20 points. Description of radiographs, scanograms, CT, MRI, ultrasound images - the number of 2 to 10 points each - the maximum number of 20 points.

The gradation of evaluation of each question corresponds to:

**0 points** – complete lack of knowledge on this issue.

**1 point** – the student superficially reveals knowledge and understanding on this issue.

**2 points – the** student partially covers this question, cannot answer additional questions.

**3 points – the** student partially covers this question, does not answer an additional question on this topic.

**4 points** – the student partially covers the question, answers additional questions on this topic.

**5 points** – the student's oral answer is correct enough, complete enough, the student cannot answer additional questions.

6 **points** - the student's oral answer is quite correct, sufficiently complete, partially can answer additional questions on this topic.

**7 points** – the student's oral response is satisfactory.

**8 points** – the oral answer is good, theoretical questions can be associated with knowledge of materials of related disciplines.

**9 points** – the student's answer is excellent, the additional questions on this topic are answered only partially.

**10 points** – the oral answer of the student meets the requirements of higher education (the topic is fully disclosed, the answer is logical, evidence-based, the student answers additional questions on this topic) in full.

**Evaluation of the presented information carriers:**

**0 points** – lack of knowledge of the presented research method.

**1 point** – the student indicates talcum powder to the research method.

**2 points – the** student gives an assessment of the research method.

**3 points** – the student gives a description of the research method and is guided in the advantages and disadvantages in comparison with other diagnostic methods.

**4 points** – the student gives a description of the research method and is guided in the advantages and disadvantages in comparison with other diagnostic methods and tell about the preparation of the patient for this examination.

**5 points** – the student gives a description of the research method and is guided in the advantages and disadvantages in comparison with other diagnostic methods and tell about the preparation of the patient for this examination. Gives an assessment of possible complications and their prevention during this study.

**6 points** - the student gives a description of the research method and is guided in the advantages and disadvantages compared to other diagnostic methods and tell about the preparation of the patient for this examination. Gives an assessment of possible complications and their prevention during this study. Partially characterizes the symptoms and syndromes of pathology of organs and systems.

**7 points** - the student gives a description of the research method and is guided in the advantages and disadvantages in comparison with other diagnostic methods and tell about the preparation of the patient for this examination. Gives an assessment of possible complications and their prevention during this study. Able to correctly assess the symptoms and syndromes of the pathology of HLD.

**8 points** - the student gives a description of the research method and is guided in the advantages and disadvantages in comparison with other diagnostic methods and tell about the preparation of the patient for this examination. Gives an assessment of possible complications and their prevention during this study. Able to correctly assess the symptoms and syndromes of the pathology of HLD. The student is partially able to characterize the symptoms and syndromes of pathology of organs and systems.

**9 points** – correctly assesses and characterizes the symptoms and syndromes of pathology of organs and systems. Able to conclude according to pathological changes in the radiological picture.

**10 points** – correctly assesses and characterizes the symptoms and syndromes of pathology of organs and systems. Able to conclude according to pathological changes in the radiological picture. Able to combine radiological symptoms with the clinical picture.

**The maximum number of points of the final modular control is 80**.

**Final module control is considered enrolled if the student scored at *least 50 points.***

Incentive points by decision of the Academic Council may be added to the number of points in the discipline for students who have scientific publications or have won prizes for participating in the Olympiad in the discipline among universities Of Ukraine and so on.

The objectivity of evaluating students' learning activities should be checked by statistical methods (correlation coefficient between current academic performance and the results of the final module control).

***Conversion of the number of points from the discipline into scores on the ECTS and 4-point (traditional)*** scales:

The number of points in the discipline awarded to students is converted to the ***ECTS***  scale as follows:

|  |  |
| --- | --- |
| **ECTS score** | **Statistical indicator** |
| **And** | **Top 10% of Students** |
| **Into** | **Next 25% of students** |
| **C** | **Next 30% of students** |
| **D** | **Next 25% of students** |
| **E** | **Last 10% of students** |

The percentage of students is determined by the voter for students of this course within the relevant specialty.

The number of points in the discipline awarded to students is converted into a 4-point scale as follows:

|  |  |
| --- | --- |
| **ECTS score** | **Score on a 4-point scale** |
| **And** | **“5”** |
| **B, C** | **“4”** |
| **D, E** | **“3”** |
| **FX, F** | **“2”** |

**The grade in the discipline FX, F ("2”)** is given to students who are not credited with at least one module in the discipline after completing its study.

**The FX ("2”)**  grade is given to students who have scored the minimum number of points for current academic activities, but have not passed the final module control. They have the right to re-draw up the final modular control no more than 2 (two) times according to the schedule approved by the rector.

**Students who have received an F**  grade for completing the study of the discipline (have not completed the curriculum in at least one module or have not scored a minimum number of points for current academic activities in the module) have  **re-train from the appropriate module.**  The decision is made by the management of the university in accordance with the regulatory documents approved in the prescribed manner.

**Assessment scale: national and ECTS**

|  |  |  |  |
| --- | --- | --- | --- |
| Sum of points for all types of educational activities | ECTS score | Score witha national scale | |
| dla exam, course project (work), practice | dla offset |
| 90 – 100 | **And** | Perfectly | enrolled |
| 82-89 | **Into** | well |
| 74-81 | **C** |
| 64-73 | **D** | Satisfactory |
| 60-63 | **E** |
| 35-59 | **FX** | unsatisfactory with the possibility of reassembly | not credited with the possibility of reassembly |
| 0-34 | **F** | unsatisfactory with the obligatory re-study of the discipline | not enrolled with mandatory re-study of the discipline |

**14. Methodological support**

**14.1.**  **General methodical materials**

**14.1.1. The purpose and objectives of the discipline**

State standards of higher medical education (OKC and OPP) require a dental graduate of a higher medical educational institution to be able to choose the optimal method from a large number of radiation examination methods existing in our time. to identify functional and morphological changes in the pathology of the jaws, teeth and HLD, to interpret the data of radiation research methods on the clinical diagnosis.

Therefore, the main task of undergraduate teaching of dental radiography in medical higher schools of Ukraine should be to familiarize the dental student with the principles of a wide variety of radiation methods for the diagnosis and treatment of diseases of HLD, indications for their use, the capabilities and limitations of each of them, the principles of protecting the patient from the undesirable effects of ionizing radiation and magnetic fields. radiography should also include that part of the special radiological terminology used by the dentist in his diagnostic report (research protocols), since the latter is compiled for the attending physician, who therefore must understand the professional language of the diagnostician. Understanding of special radiological terminology is based on comprehension of the principles of obtaining diagnostic images of tissues, organs, as well as the processes operated by the radiologist and dentist in making diagnostic and clinical solutions.

**14.1.2.**  **Analysis of relations with related disciplines.**

The new program on radiation diagnostics and radiation therapy includes the study of the physical and technical foundations of methods of radiation diagnostics and radiation therapy, dosimetry, biological action of ionizing radiation, radiobiological bases of radiation therapy, radiation anatomy and semiotics of diseases. The material taught is based on data from the disciplines studied earlier by students – physics, normal anatomy, normal physiology, biology, biochemistry and biophysics, knowledge of pathological anatomy and pathological physiology, which students receive in parallel with the study of the course of radiation diagnostics and radiation therapy.

**14.1.3.**  **Methods of activation and intensification of learning**

In order to intensify the educational process, the department acquaints students in advance with the thematic plans of lectures and practical classes, which gives them the opportunity to preliminarily find out the material that will be discussed in the classroom. Students are also taught to correctly take notes of lectures and keep protocols of practical classes.

Activation and intensification of the educational process is facilitated by the educational and research work of students (UDRS), which is aimed at the formation of students' research skills, a creative approach to mastering the course of physiology.

Forms of UDRS. which are used at the department:

* analysis in practical classes of various methods of radiation diagnostics provided for by the curriculum;
* mastering after school hours additional manipulations, methodological measures that do not go into the curriculum:
* abstract work:
* speeches with scientific information or a report at classes or meetings of the department, society:
* participation in scientific quizzes, olympiads, conferences:
* participation in the preparation and design of scientific stands, tables and others.

**15. Recommended literature**

**Basic**

1. Mylko V.I., Lazar A.F., Nazymok N.F. Medical radio-giya. - K., 1989.-231 p.
2. Selected lectures on radionuclide diagnostics and radiation therapy / Ed. Lazarya A.P. - Vinnitsa: NEW BOOK, 2006. - 200 p.
3. Lindenbraten L.D., Korolyuk I.P. Medical radiology and radiology / Fundamentals of ray diagnostics and ray therapy/: Uchebnik. — M.: Medicine, 1993. - 560 p.
4. Lindenbraten L.D., Lass F.M. Medical Radiology. - M.: Medicine, 1986.-446 p.
5. Lindenbraten L.D., Naumov L.B. Medical Radiology. - M.: Medicine., 1984. - 345 p.
6. Rabukhina N.A., Arzhantsev A.P. X-ray diagnostics in dentistry. - M.: LLC "Medical Information Agency", 2003. - 452 p.
7. Radiation Medicine / Ed. Lazarya A.P. - K., 1993.
8. Rasulov M.M., Abakarov S.I., Kurbanova Z.A., Murtazalyev G.-M.G., Abakarova D.S., Rasulov I.M. X-ray diagnostics in dentistry. - Moscow: Medical Book, Publishing "Dentistry", 2007. - 188 p.

**Secondary**

1. Clinical radiology. Guide for lessons in 5 volumes / Ed  
   . Zedgenidze G.A. - M.: Medicine, 1983-1985.
2. Clinical guidance on ultrasonic diagnostics / Edited by Mitkova V.V. - M.: Vydar, 1996. -T.1.-336 p.
3. General guidance on radiology in 2 volumes / NICER Institute / - M.: Medicine, 1995. - 1330 p.
4. Pozmogov A.I., Ternovoy S.K., Babiy Y.S., Lepihin N.M. Tomography of the thoracic cell. - K., 1992. - 342 p.
5. Radiation diagnostics: /In 2 volumes/ Koval G.Yu., Syvachenko T.P., Zagorodskaya M.M. and others. - K.: Orbis, 1998. - 527 p.
6. X-ray diagnostics in the practice of a dentist / Friedrich A. Pasler, Heiko Wisser; Ed. Rabukhina N.A. - M.: MED-press-inform, 2007. - 352 p.
7. X-ray diagnostics in pediatrics. Guide for vrachei in 2 volumes. / Ed. Bakmenovoy V.F., Filipkina M.A. / - M: Medicine, 1988. - 324 p.
8. Suslova O. X-ray diagnostics of injuries and diseases of the resistance-motor apparatus. - K.: Health, 1989. - 203 p.