

**MINISTRY OF SCIENCE AND HIGHER EDUCATION
RUSSIAN FEDERATION**

**FEDERAL STATE AUTONOMOUS EDUCATIONAL INSTITUTION OF
HIGHER EDUCATION
NORTH-CAUCASUS FEDERAL UNIVERSITY**

Methodological Guidelines
for Students on arranging and performing independent work
in the Discipline of "Telemedicine"
for Students majoring (Specialty) in 31.05.01 General Medicine

introduction

The aim of studying the discipline is to train a modern specialist possessing basic knowledge, abilities, and skills in the application of new Internet technologies in professional activities.

To achieve the goal, the following tasks must be solved:

- to reveal the concepts, theoretical foundations, and stages of formation and development of the new direction of Internet technologies — telemedicine;
- to study the main types of telemedicine services;
- to examine the means of transmitting telemedicine information;
- to demonstrate the prospects for the development of new information technologies and their application in practical healthcare and medical education.

Methodological Recommendations for Studying Theoretical Material

When performing the independent study of theoretical material, the student must follow the rules as set below. The working curriculum of the respective academic discipline shall be recommended to be used as the basis for such activity. According to the schedule of classroom lessons and independent work, a different number of hours is to be allocated for studying individual topics. A significant portion of the student's independent work should be allocated to mastering the material on the covered topic, writing a summary (notes) on the specified theoretical blocks, and searching for additional literature based on the NCFU library and via the Internet system. The lecture material shall not cover all theoretical material; the greater part of it must be mastered through independent work. Given the above, working with the recommended literature is mandatory. Special attention must be paid to the content of the main provisions and conclusions, the explanation of phenomena and facts, and the understanding of the practical application of the theoretical issues under consideration. In the process of this work, the student should strive to understand and memorize the main provisions of the material being considered, the examples illustrating it, as well as to understand the illustrative material. Preparation should be completed by drawing up a plan (summary/notes) on the material (issue) being studied. This allows for the creation of a concentrated, concise representation of the issues being studied. First, studying the recommended literature is to be done. Special attention must be paid to the content of the main provisions and conclusions, the explanation of phenomena and facts, and the understanding of the practical application of the theoretical issues under consideration.

During this work, the student should strive to understand and memorize the main provisions of the material being considered, the examples illustrating it, as well as to understand the illustrative material. Preparation should be completed by drawing up a plan (summary/notes) on the material (issue) being studied. This allows for the creation of a concentrated, concise representation of the issues being studied. If necessary, one should seek (advice) consultation from the instructor. When going to a consultation, it is necessary to thoroughly think through the questions that require clarification. Keeping records contributes to turning reading into an active process, mobilizing motor memory along with visual memory. The following should be born in mind: a student who systematically keeps records creates their own individual stock of auxiliary materials for a quick review of what has been read and for the mobilization of accumulated knowledge. Records are especially important and useful when they reflect the thoughts that arose during independent work.

It is important to develop the students' capacity to compare sources and to think through the material being studied.

Improving note-taking skills among students is of great importance.

The instructor may recommend the following main forms of recording to students: a plan (simple and detailed), excerpts, and theses (abstracts).

The results of note-taking can be presented in various forms.

1. A plan is an outline of the read material, a brief (or detailed) list of questions reflecting the structure and sequence of the material.

2. A detailed plan fully replaces a summary.
3. A summary (notes) is a systematized, logical presentation of the source material. Four types of summaries are distinguished:
4. Outline-summary (Plan-notes) – this is an expanded, detailed plan in which sufficiently detailed records are provided for those points of the plan that need explanation.
5. Textual summary – this is the reproduction of the most important provisions and facts of the source.
6. Free summary – these are clearly and briefly formulated (stated) main provisions resulting from a deep understanding of the material. It may contain excerpts, quotations, and theses; part of the material may be represented by a plan.
7. Theme-based summary – this is compiled on the basis of studying a number of sources and gives a more or less exhaustive answer according to a certain scheme (issue).

Methodological Guidelines for the Preparation for Practical Activities

When preparing for practical activities, the recommendation implies studying the control questions for the given lesson and the theoretical material from one's own notes.

The main form of work during the lessons is an interview (discussion). Each student must be ready to speak on all issues raised in the plan and demonstrate maximum activity during their consideration.

The speech must be constructed freely, convincingly, and with arguments. The instructor ensures that the speech is not reduced to a reproductive level (simple reproduction of the text); simple reading of the summary is also not allowed.

It is necessary for the speaker to show their own attitude towards what they are talking about, express their personal opinion and understanding, substantiate it, and be able to draw the correct conclusions from what has been said. In doing so, the student may refer to the entries in the summary, directly to the primary sources, use knowledge of previously studied disciplines, etc. In addition, to obtain a grade at an advanced level, students solve situational tasks based on the results of the mastered topics.

During the execution of practical works, a defense of practical skills is provided, the full list of which is specified in the fund of assessment tools.

Methodological Recommendations for the Preparation of Presentations and Reports

The report must contain elements of novelty; along with the fundamental aspect, an analysis of the current state of the problem under study must be carried out, as well as inclusion in regional issues. The report must include an introduction, a theoretical part, a conclusion, a list of literature, and a presentation that reveals the essence of the topic in graphs, pictures, diagrams, and formulas.

The report is recommended to be submitted on 1 printed sheet. The text of the work must be printed with 1.5 line spacing on one side of a standard sheet (A4) of white paper.

The text and other printed elements of the work must be black, and the contours of letters and signs must be clear, without halos and shading. The font must be Times New Roman, size 14. The titles of chapters and paragraphs are highlighted in bold. The sheet with text must have margins: left – 30 mm, right – 10 mm, top – 20 mm, bottom – 20 mm.

Page numbering of the text is done in the lower right corner of the sheet. It is necessary to number pages starting from the page where the Introduction is printed, on which the number 3 is placed. After that, all pages, including appendices, are numbered.

A space equal to two intervals is placed between the title of the chapter and the title of the paragraph of this chapter, and the title of the paragraph must not be separated from the text of this paragraph by a space. The titles of paragraphs shall be separated from the text of the previous paragraph by a space equal to two intervals. Each chapter, as well as the introduction, conclusions, appendices, and the list of used literature, begin on a new page. The word Chapter is not to be

written. Chapters have ordinal numbers within the entire work, designated by Arabic numerals (for example: 1, 2, 3), followed by a period.

The word **PARAGRAPH** or the paragraph symbol (§) is not placed in the title. Paragraphs have ordinal numbers within the chapters, designated by Arabic numerals (for example: 1.1. and 1.2.).

Headings of chapters and paragraphs in the text must be centered; a period shall not be placed at the end of the title of the chapter and paragraph. It is not allowed to hyphenate (transfer) a part of a word in a heading. 4.5. The numbering of tables and figures can be running (continuous) or relate to the number of the chapter and paragraph. For example, if a table or a figure is included in the text of the first paragraph of the second chapter, the numbering is as follows: Table 2.1.1., Fig. 2.1.1.

The last digit means the ordinal number of the table (or figure) in this paragraph.

The table is to be placed as the next page after the first mention of it in the text.

Recommended literature.

Main literature:

1. Kobrinsky, B. A. (2016). Telemedicine in the System of Practical Healthcare [Electronic resource]: practical guide. 2nd ed., stereotype. Moscow; Berlin: DirectMedia. 238 p. Available by subscription at: <https://biblioclub.ru/index.php?page=book&id=434738>
2. Stolyar, V. L., Amcheslavskaya, M. A., Antipov, A. I. et al. (2017). Fundamentals of Telemedicine [Electronic resource]: textbook. Moscow: Peoples' Friendship University of Russia. 236 p. ISBN 978-5-209-07476-2. Available at: <https://www.iprbookshop.ru/91042.html>

Additional literature:

1. Zenzin, A. S. (2011). Information and Telecommunication Networks [Electronic resource]: textbook. Novosibirsk: Novosibirsk State Technical University. 80 p. ISBN 978-5-7782-1601-3. Available at: <https://www.iprbookshop.ru/44932.html>
2. Intelligent and Information Systems in Medicine: Monitoring and Decision Support [Electronic resource]. (2016). Moscow; Berlin: DirectMedia. 529 p. Available by subscription at: <https://biblioclub.ru/index.php?page=book&id=434736>

Online resources:

1. <http://rudocor.net> - Medical Portal
2. <http://www.e-reading.club> / - Great Online Library
3. <https://dic.academic.ru> / - Dictionaries and Encyclopedias
4. <https://roszdravnadzor.gov.ru> / - Federal Service for Supervision of Healthcare
5. <https://www.rmj.ru> / - Russian Medical Journal

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- to study the main types of telemedicine services;
- to examine the means of transmitting telemedicine information;
- to demonstrate the prospects for the development of new information technologies and their application in practical healthcare and medical education.

Questions for the interview

1. Information society and its features. Information resources. Information technologies. Forms of creation and dissemination of information. Priority directions of development of the modern information society and tasks of healthcare. Definition of telemedicine, e-health. Purpose, subject and functions of telemedicine.
2. Periodization of the history of telemedicine. Terms of telemedicine and the history of their appearance. Development of television communication, computer technology and the Internet.
3. Norms relating to the regulation of medicine. Norms relating to the regulation of information relations. Documents concerning the ethics of medical activity. Legal support of telemedicine activities. Main stages of organizing a telemedicine service in a region. Approaches to forming an infrastructure for telemedicine.
4. Telemedicine center. Provision of telemedicine interaction. National and regional models of organizing telemedicine networks. Specialized equipment. Diagnostic and treatment equipment. Individual information carriers. Means of visualization of the patient and the site of disease. Means of obtaining and processing electrograms. Means of measuring indicators. Means for broadcasting examinations. Means of remote control of therapeutic devices. Standard types of telemedicine complexes. Digital photography of medical information. Methodology of digital photography in medicine. General algorithms of photography. Computer processing of digital photographs. Features of presenting digital photographs for telemedicine consultation.
5. Means of transmitting telemedicine information. Internet services: concept and types of medical information. E-mail. Mailing lists. FTP — data transfer. IP telephony. Hypermedia system WWW. International satellite systems and digital networks: general characteristics of systems. Characteristics of terminals. Cost of subsystem kits. Tariff plans. Digital networks with integration of services. Concept of digital networks. Types of channels (transmission speed, switching technologies). Advantages of digital networks. Radio modem technologies. Regional networks.
6. Main types of telemedicine services. Telemedicine consultation. Definition, goals and objectives, stages of a telemedicine consultation. Classification of telemedicine consulting. Indications for telemedicine consultation. Participants in a telemedicine consultation. Formation of documentation for a telemedicine consultation.
7. General scenarios of telemedicine consulting. Safety of telemedicine consulting. Basic and additional tools of clinical telemedicine consulting. Documentation of a telemedicine consultation.
8. Medical databases. Concept and classification of databases of scientific and medical information. Purpose, structure and capabilities of reference, bibliographic, abstract and factual databases.
9. Distance learning. Definition, goals, objectives and features of distance learning. Technologies of distance learning in medicine. Video conference. Webinar. Web platform (virtual learning environment). Specialized website. Electronic mailing. Multimedia training

- and controlling system (media educator). Network electronic textbook. The role of the teacher in the distance learning system. Technologies and effectiveness of telemedicine. Home telemedicine. Definition, classification and purpose of monitoring systems. In-hospital monitoring systems. Out-of-hospital monitoring systems. Mobile monitoring systems.
10. From data to knowledge. Data warehouse. Characteristics and scope of Data Mining technology. Discovery of regularities. Classes of Data Mining systems: subject-analytical systems, statistical packages, neural networks, case-based reasoning systems, decision trees, evolutionary programming, genetic algorithms, algorithms of limited search.
 11. Effectiveness of telemedicine. Classification of methods for assessing the effectiveness of telemedicine. Clinical methods for assessing the effectiveness of telemedicine. Non-clinical methods for assessing the effectiveness of telemedicine. Comprehensive assessment of the effectiveness of a telemedicine consultation. Relevance. Economic feasibility. Qualitative indicators. Method of objectification and assessment of the dynamics of the number of telemedicine consultations over a certain period of time. Criteria for evaluating and planning telemedicine activities.
 12. Information society and its features.
 13. Information resources.
 14. Information technologies.
 15. Forms of creation and dissemination of information.
 16. Priority directions of development of the modern information society and tasks of healthcare.
 17. Definition of telemedicine, e-health. Purpose, subject and functions of telemedicine.
 18. Periodization of the history of telemedicine.
 19. Terms of telemedicine and the history of their appearance.
 20. Development of television communication, computer technology and the Internet.
 21. Norms relating to the regulation of medicine.
 22. Norms relating to the regulation of information relations.
 23. Documents concerning the ethics of medical activity.
 24. Legal support of telemedicine activities.
 25. Main stages of organizing a telemedicine service in a region.
 26. Approaches to forming an infrastructure for telemedicine.
 27. Telemedicine center.
 28. Provision of telemedicine interaction.
 29. National and regional models of organizing telemedicine networks.
 30. Individual information carriers.
 31. Means of visualization of the patient and the site of disease.
 32. Means of obtaining and processing electrograms.
 33. Means of measuring indicators.
 34. Means for broadcasting examinations.
 35. Means of remote control of therapeutic devices.
 36. Standard types of telemedicine complexes.
 37. Methodology of digital photography in medicine.
 38. General algorithms of photography.
 39. Computer processing of digital photographs.
 40. Features of presenting digital photographs for telemedicine consultation.
 41. Concept and types of medical information.
 42. Internet services: E-mail. Mailing lists. FTP — data transfer. IP telephony. Hypermedia system WWW.
 43. International satellite systems and digital networks: general characteristics of systems. Characteristics of terminals. Cost of subsystem kits. Tariff plans. Digital networks with integration of services.
 44. Concept of digital networks. Types of channels (transmission speed, switching technologies). Advantages of digital networks.

45. Radio modem technologies.
46. Regional networks.
47. Definition, goals and objectives, stages of a telemedicine consultation.
48. Classification of telemedicine consulting.
49. Indications for telemedicine consultation. Participants in a telemedicine consultation.
50. Formation of documentation for a telemedicine consultation.
51. General scenarios of telemedicine consulting.
52. Safety of telemedicine consulting.
53. Basic and additional tools of clinical telemedicine consulting.
54. Documentation of a telemedicine consultation.
55. Concept and classification of databases of scientific and medical information.
56. Purpose, structure and capabilities of reference, bibliographic, abstract and factual databases.
57. Definition, goals, objectives and features of distance learning.
58. Technologies of distance learning in medicine.
59. Video conference. Webinar. Web platform (virtual learning environment). Specialized website. Electronic mailing.
60. Multimedia training and controlling system (media educator).
61. Network electronic textbook. The role of the teacher in the distance learning system.
62. Definition, classification and purpose of monitoring systems.
63. Data warehouse. Characteristics and scope of Data Mining technology. Discovery of regularities. Classes of Data Mining systems: subject-analytical systems, statistical packages, neural networks, case-based reasoning systems, decision trees, evolutionary programming, genetic algorithms, algorithms of limited search.
64. Classification of methods for assessing the effectiveness of telemedicine.
65. Comprehensive assessment of the effectiveness of a telemedicine consultation.
66. Relevance. Economic feasibility. Qualitative indicators.
67. Method of objectification and assessment of the dynamics of the number of telemedicine consultations over a certain period of time.
68. Criteria for evaluating and planning telemedicine activities.

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1. <http://rudoctor.net> - Medical Portal
2. <http://www.e-reading.club> / - Great Online Library
3. <https://dic.academic.ru> / - Dictionaries and Encyclopedias

4. <https://roszdravnadzor.gov.ru> / - Federal Service for Supervision of Healthcare
5. <https://www.rmj.ru> / - Russian Medical Journal