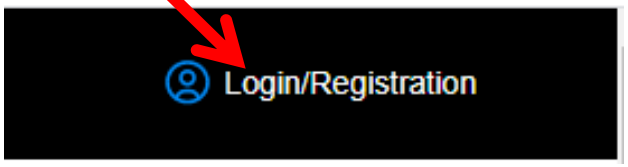
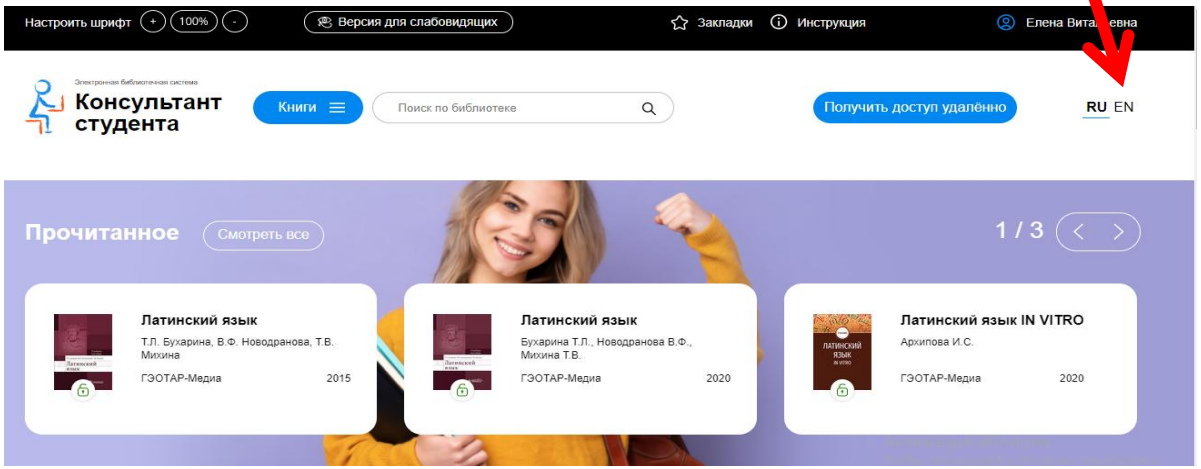
Instructions for the electronic library system «Student Consultant»

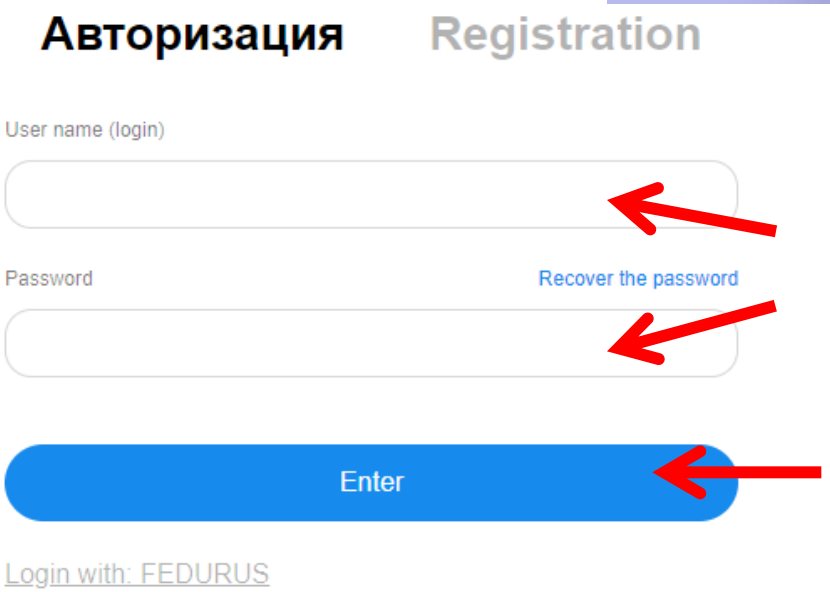
(English version)

1. Follow the link
https://www.studentlibrary.ru/



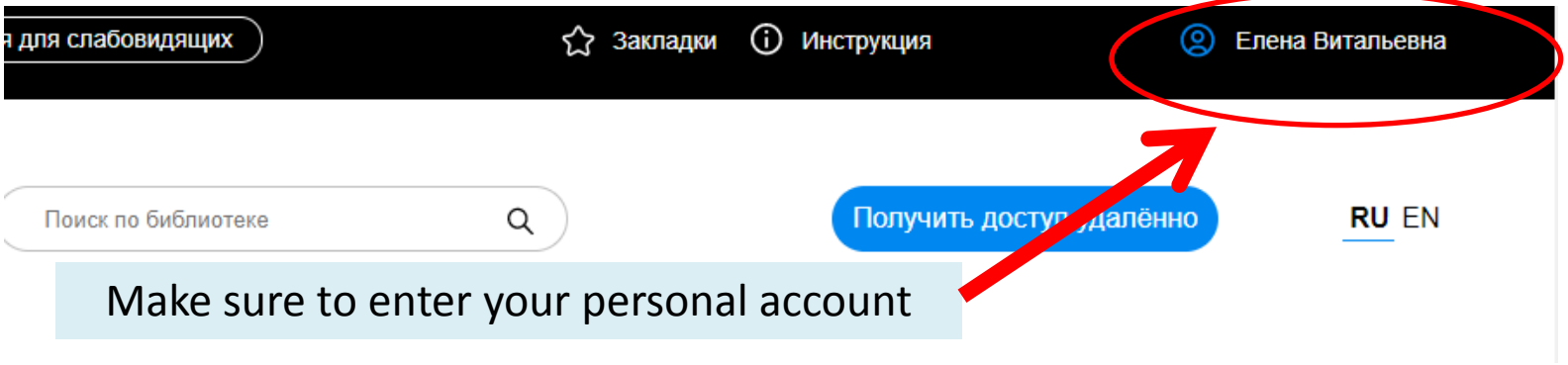
2. Do not forget! Press EN
(to translate the text into English)



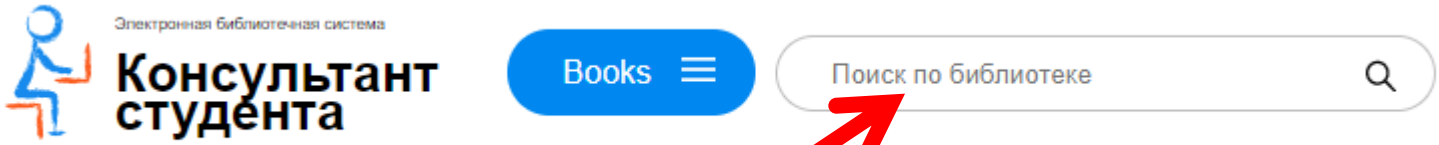


3. Be sure to fill in the user name (login) and password
(which came up at the time of registration)

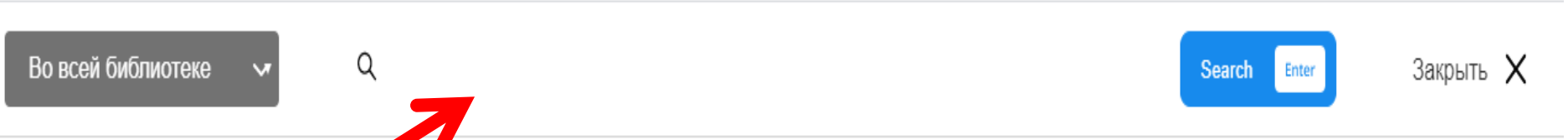
4. Press Enter



Начинаем поиск



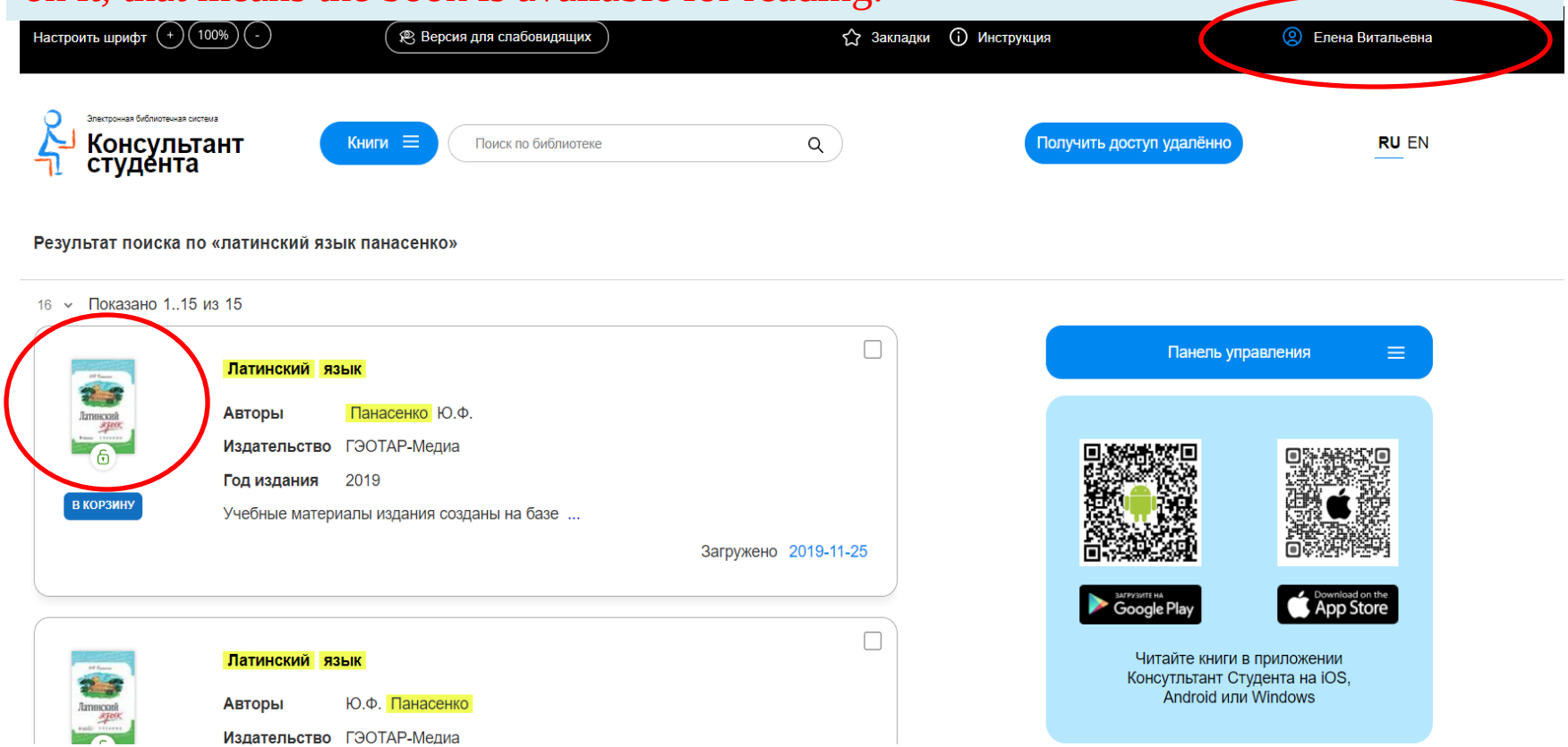
Click on it



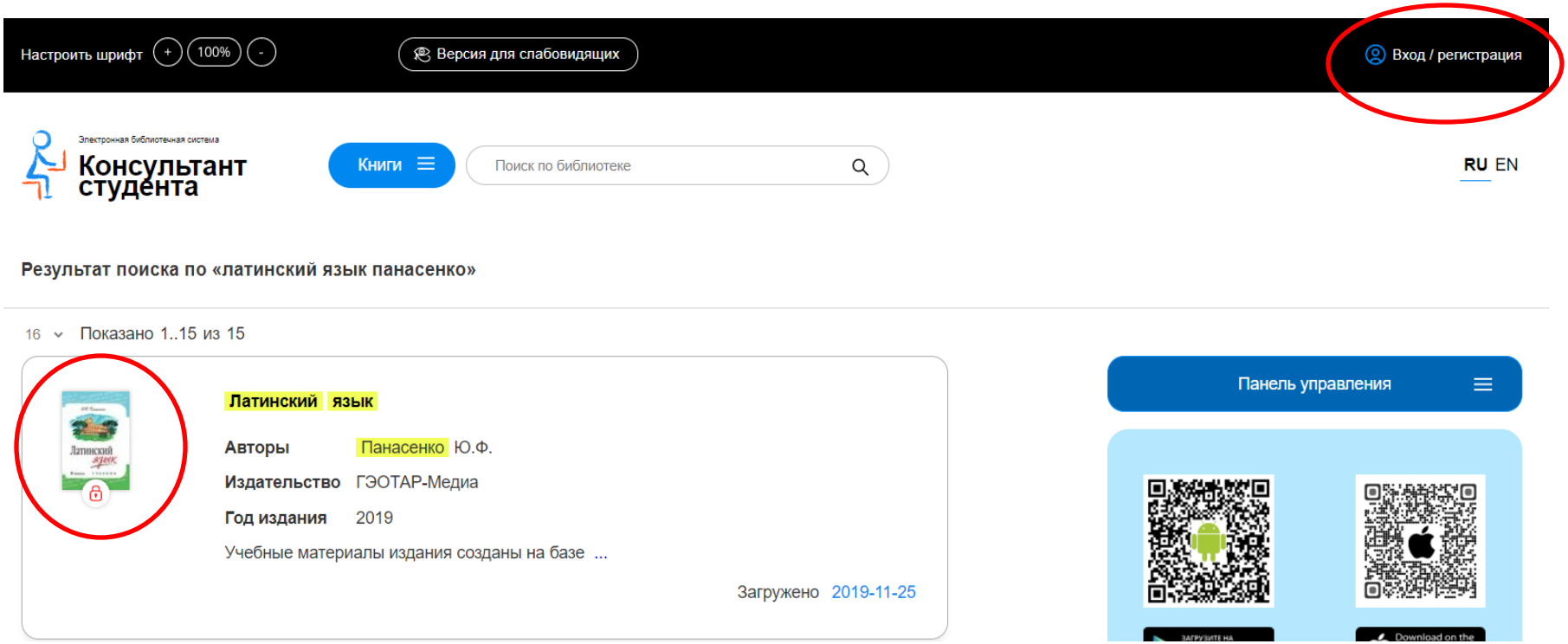
A search bar appears

In the search box type the book title and author’s surname

If you are logged in (under your login and password), the book will have a green lock on it, that means the book is available for reading.



If not you haven't logged into your personal account, the book will have a red lock on it, that means you don't have access. In this case log into your account!



Attention!

You don't have access to ALL the books in the e-library

You don't have access to ALL of them

ПРЕДИСЛОВИЕ

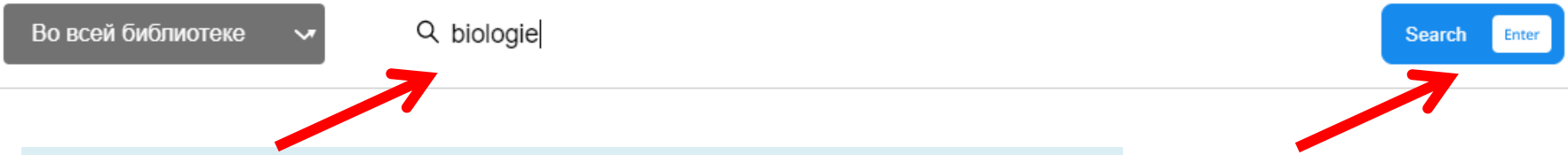
Услышал - забыл, Увидел - запомнил, Сделал - понял!

Выражение, приписываемое Конфуцию, в настоящее время приобрело популярность в методике преподавания во всём мире. Причём при передаче его на разных языках усиливаются разные оттенки его практической направленности:

I hear and I forget,	Я слышу и забываю,
I see and I remember,	Я вижу и запоминаю,
I do and I understand.	Я делаю и понимаю.

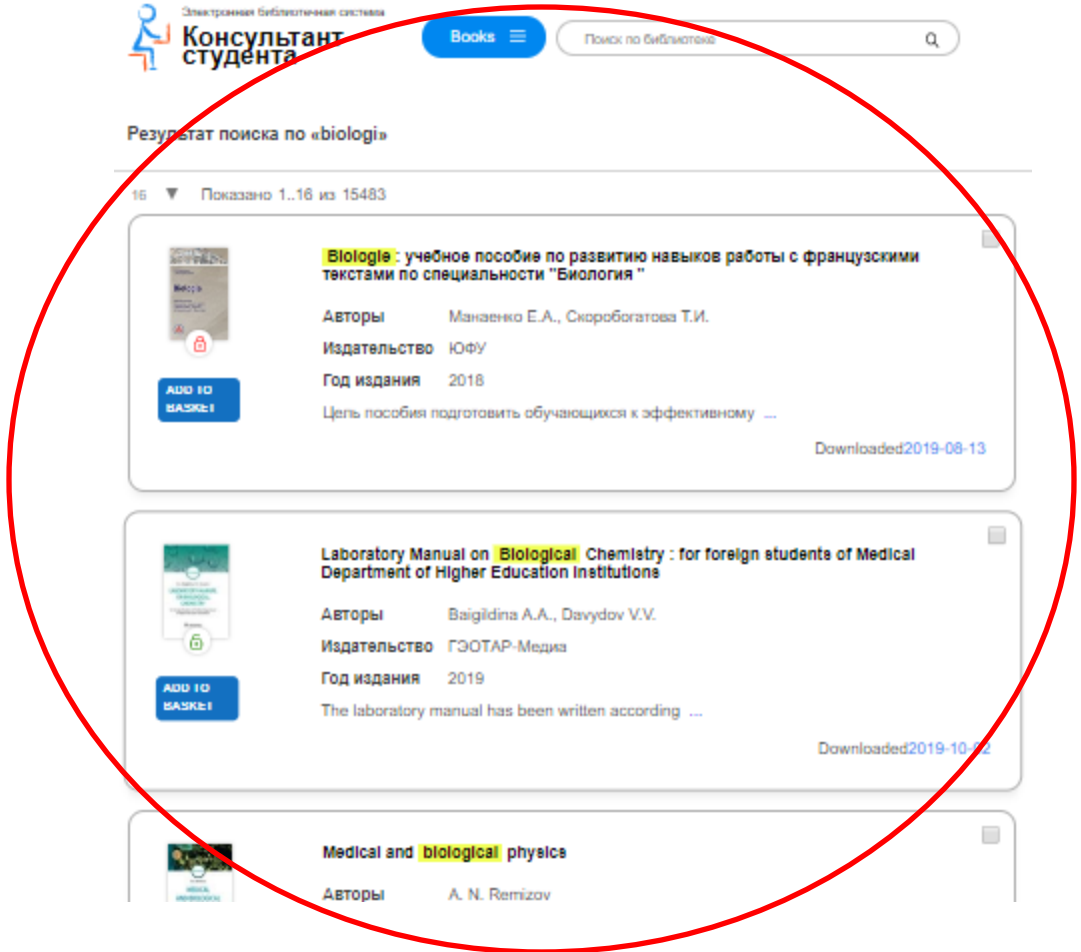
Erkläre mir und ich vergesse,	Объясни мне, и я забуду,
Zeige mir und ich erinnere mich,	Покажи мне, и я запомню,
Lass mich tun und ich verstehe.	Дай мне сделать, и я пойму.

Эту мысль, хотя и менее резко выраженную, можно найти и в комплекте латинских афоризмов:

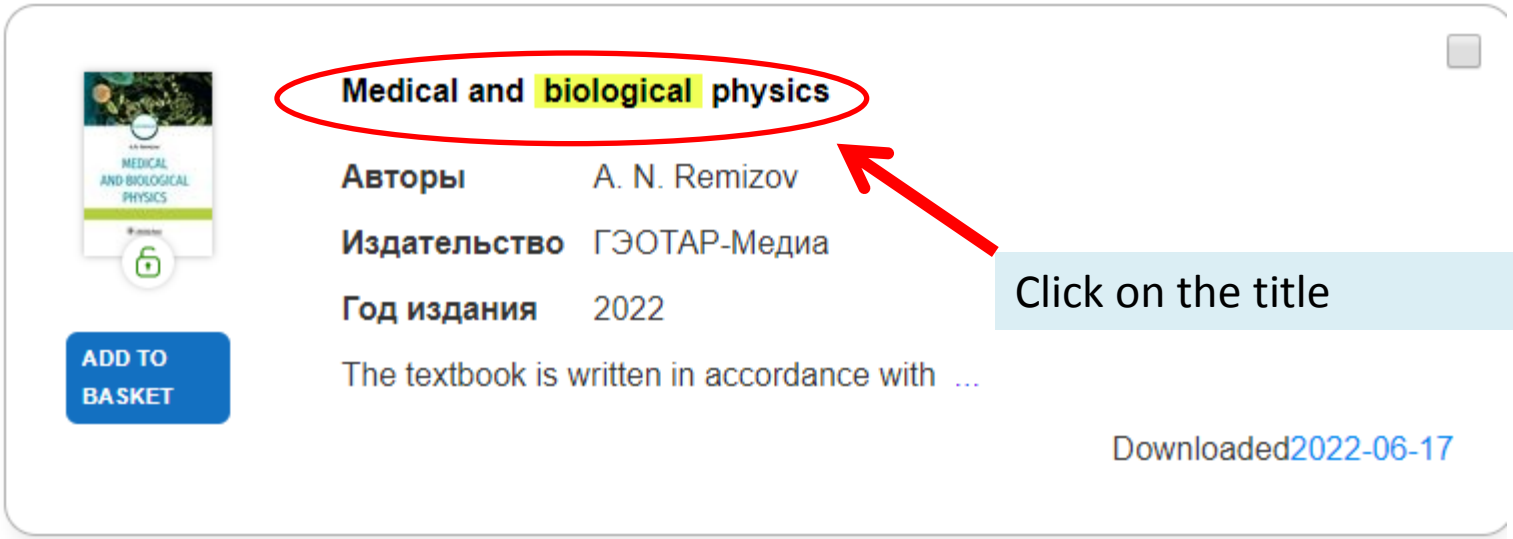


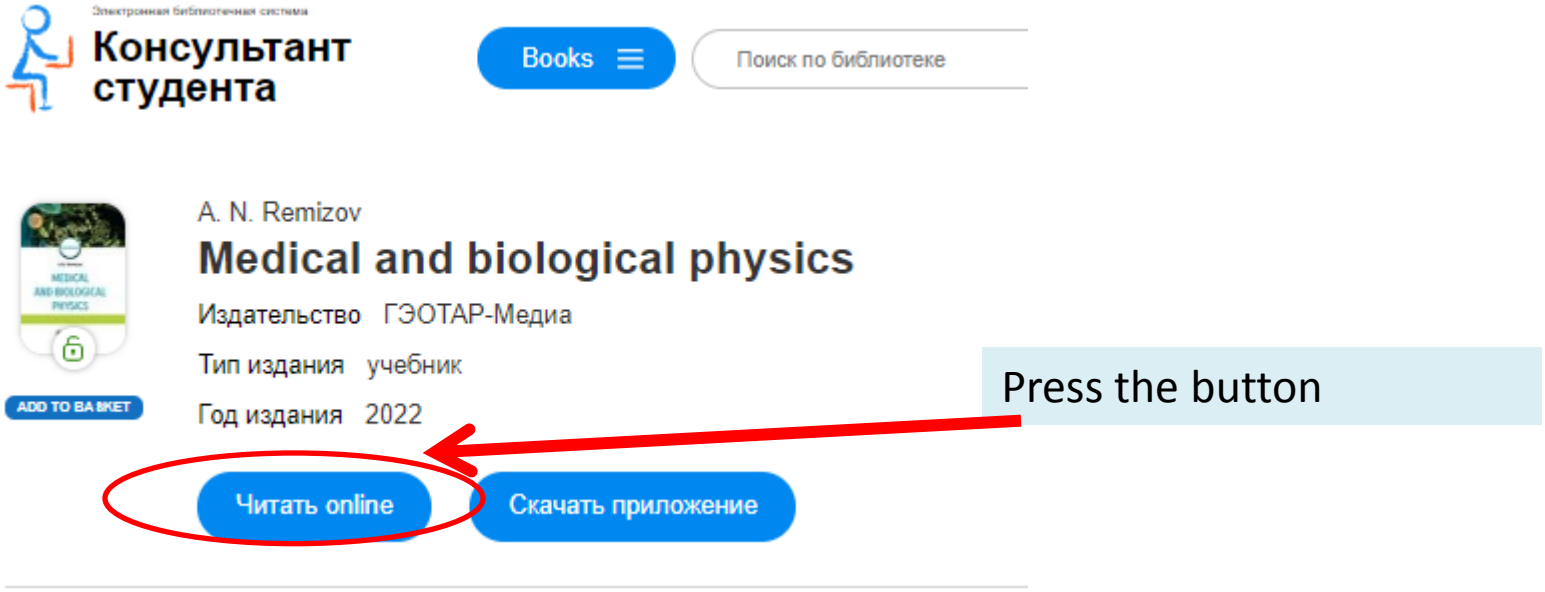
You can type in the book title or the keyword.
Example: biology

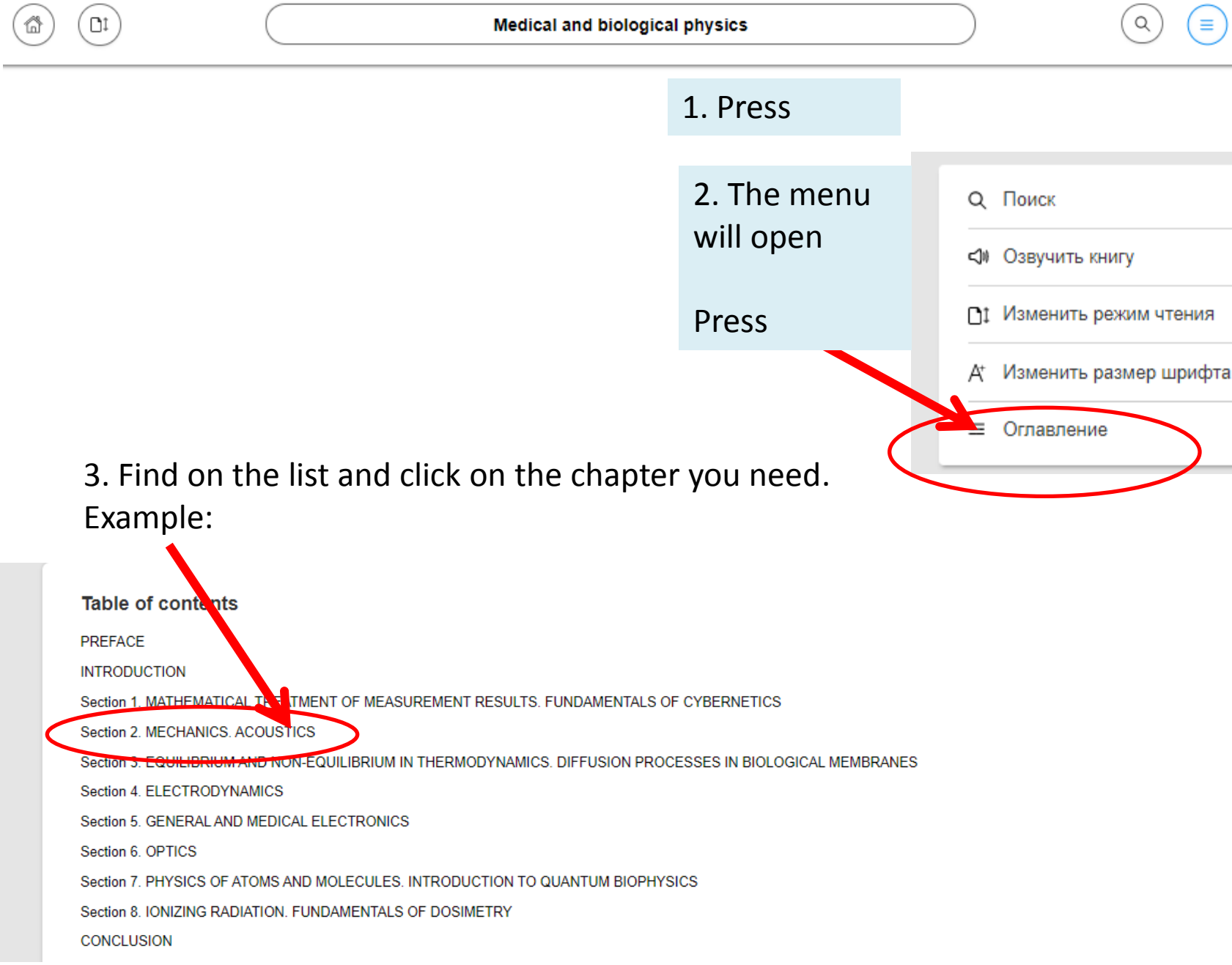
See the list of found books



For example, you need a book from the list



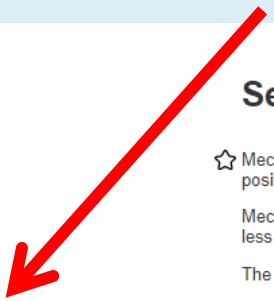


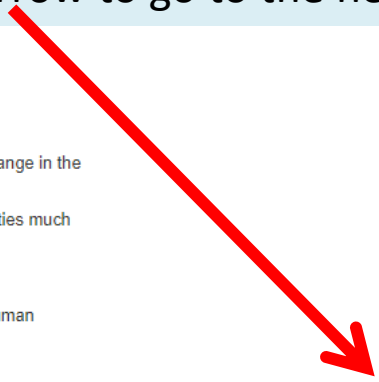

Medical and biological physics
1. Press
2. The menu will open
Press
Поиск
Озвучить книгу
Изменить режим чтения
Изменить размер шрифта
16px
Оглавление
3. Find on the list and click on the chapter you need.
Example:
Table of contents
PREFACE
INTRODUCTION
Section 1. MATHEMATICAL TREATMENT OF MEASUREMENT RESULTS. FUNDAMENTALS OF CYBERNETICS
Section 2. MECHANICS. ACOUSTICS
Section 3. EQUILIBRIUM AND NON-EQUILIBRIUM IN THERMODYNAMICS. DIFFUSION PROCESSES IN BIOLOGICAL MEMBRANES
Section 4. ELECTRODYNAMICS
Section 5. GENERAL AND MEDICAL ELECTRONICS
Section 6. OPTICS
Section 7. PHYSICS OF ATOMS AND MOLECULES. INTRODUCTION TO QUANTUM BIOPHYSICS
Section 8. IONIZING RADIATION. FUNDAMENTALS OF DOSIMETRY
CONCLUSION

For the convenience of working with text use navigation

Left arrow to return to the previous page

Right arrow to go to the next page





Section 2. MECHANICS. ACOUSTICS

Mechanics is a part of physics in which mechanical motion of material bodies is studied. Mechanical motion means change in the position of a body or its parts in space over time.

Mechanics based on Newton's laws is called classical mechanics. It deals with motion of macroscopic bodies at velocities much less than the velocity of light in free space.

The subject matter of this section can be of interest for the following reasons:

- understanding mechanics of motion of the whole body for purposes of sports and space medicine, mechanics of a human musculoskeletal system for purposes of anatomy and physiology;
- learning about mechanical properties of biological tissues and fluids;
- understanding the ear and vestibular apparatus operation as physical devices, the heart as a pump, etc.;
- explanation of the biophysical mechanism of action of ultrasound;
- understanding physical fundamentals of some laboratory techniques used in practice of biomedical research, e.g., centrifugation.

Chapter 5 Mechanics of rotational motion

Observing complex movements, such as the movement of a human body (walking, running, jumping, etc.), it seems difficult or even impossible to describe motion of all its points. However, analyzing such movements, it can be seen that they consist of simpler ones - translational and rotational movements.

The reader already knows the mechanics of translational motion, so the section begins with consideration of rotational motion. The simplest one is rotation of a solid body about the fixed axis. This case makes it possible to familiarize yourself with the

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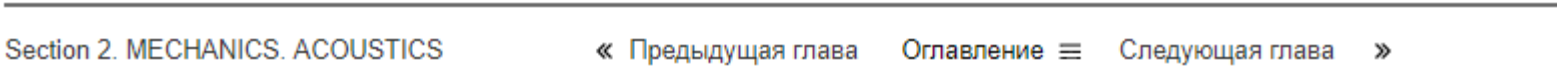
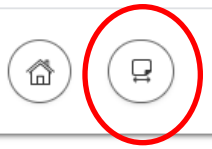


You can click on this sign to change the view



PREFACE

According to the author, a physics course at a medical university, along with fundamentality, should have a specific ? medical address?, i.e., be profiled. Profiling is selection of material and illustration of possible applications of physics in medicine. Profiling not only motivates students to study physics, it is necessary due to the rather small volume of the ourse i

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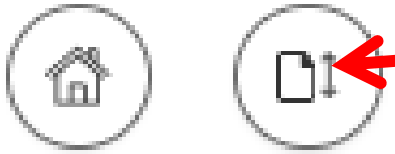
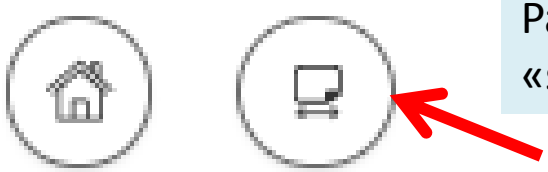
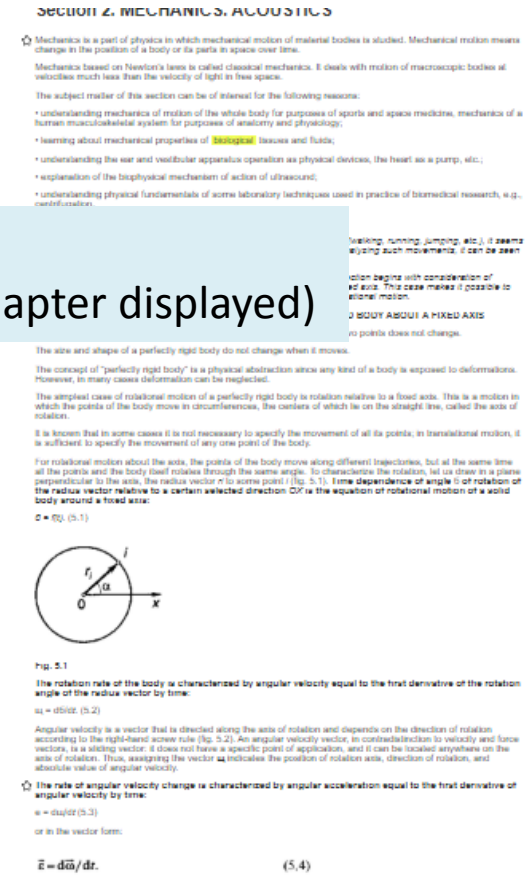


Pay attention!
«page view mode» (one page displayed)



Pay attention!
«scroll mode» (all pages of one chapter displayed)



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ation begins with consideration of d axis. This case makes it possible to ational motion.

) BODY ABOUT A FIXED AXIS

o points does not change.

The size and shape of a perfectly rigid body do not change when it moves.

The concept of "perfectly rigid body" is a physical abstraction since any kind of a body is exposed to deformations. However, in many cases deformation can be neglected.

The simplest case of rotational motion of a perfectly rigid body is rotation relative to a fixed axis. This is a motion in which the points of the body move in circumferences, the centers of which lie on the straight line, called the axis of rotation.

It is known that in some cases it is not necessary to specify the movement of all its points; in translational motion, it is sufficient to specify the movement of any one point of the body.

For rotational motion about the axis, the points of the body move along different trajectories, but at the same time all the points and the body itself rotates through the same angle. To characterize the rotation, let us draw in a plane perpendicular to the axis, the radius vector r to some point i (fig. 5.1). **Time dependence of angle θ of rotation of the radius vector relative to a certain selected direction OX is the equation of rotational motion of a solid body around a fixed axis:**

$\theta = f(t)$ (5.1)

Fig. 5.1

The rotation rate of the body is characterized by angular velocity equal to the first derivative of the rotation angle of the radius vector by time:

$\omega = d\theta/dt$ (5.2)

Angular velocity is a vector that is directed along the axis of rotation and depends on the direction of rotation according to the right-hand screw rule (fig. 5.2). An angular velocity vector, in contradistinction to velocity and force vectors, is a sliding vector: it does not have a specific point of application, and it can be located anywhere on the axis of rotation. Thus, assigning the vector ω indicates the position of rotation axis, direction of rotation, and absolute value of angular velocity.

The rate of angular velocity change is characterized by angular acceleration equal to the first derivative of angular velocity by time:

$\varepsilon = d\omega/dt$ (5.3)

or in the vector form:

$\vec{\varepsilon} = d\vec{\omega}/dt.$ (5.4)

Good reading and good work!