Undergraduate track program: Physical and Technical Sciences

This document outlines the scope of topics that may be included in the Olympiad tests. The topics are grouped by areas and are followed by the list of recommended sources in the Russian and English languages.

1. Olympiad winner's skill set

To win the Olympiad, you should have a firm grasp of physical and technical sciences concepts, namely:

- basic terms, concepts, and laws of physics outlined below, along with their significance and applications in explaining various natural phenomena.

You should also have a solid command of the following skills:

- analyzing physical systems and conditions, formulating typical problems in general physics mathematically, and employing suitable mathematical techniques to resolve them;
- clearly and logically presenting the results of your physical problem-solving.

2. List of degree programs covered by subject area

2.1 List of bachelor's programs:

03.03.02 Physics
03.03.03 Radiophysics
04.03.02 Chemistry, Physics and Mechanics of Materials
11.03.01 Radio Engineering
11.03.03 Design and Technology of Electronic Equipment
11.03.04 Electronics and Nanoelectronics
12.03.01 Instrument Engineering
12.03.02 Optotechnics
12.03.05 Laser Engineering and Laser Technologies
15.03.03 Applied Mechanics

3. Content

Atomic, Molecular and Chemical Physics
Topics in Physics

1. Planetary model of the atom
2. Nucleons in nuclear model. Isotopes
3. Alpha, beta, gamma radiation
4. Law of radioactive decay
5. Atomic spectra
6. Nuclear reactions. Nuclear fission and fusion

Optics
Topics in Physics

1. Laws of reflection and refraction of light
2. Formula of a thin lens
3. Construction of images in plane mirror and lenses
4. Coherence. Interference of light
5. Diffraction of light. Diffraction grating

Condensed Matter Physics
Topics in Physics
1. Models of the structure of liquids and solids
2. Evaporation and condensation
3. Melting and crystallization
4. Triple point, critical temperature, phase diagrams
5. Energy transformations during phase transitions

Quantum Technologies
Topics in Physics
1. Planck's formula
2. Laws of photoeffect
3. Einstein's equation

Electrical Engineering and Electronics
Topics in Physics
1. Electric charge. Coulomb's law
2. Electric field
3. Field of a point charge. Principle of superposition of electric fields
4. Electric potential
5. Energy of interaction of a system of charges
6. Relation between electric field and electric potential
7. Field of one and two charged planes
8. Polarization of dielectrics. Field in dielectrics
9. Electrical capacitance. Capacitance of a flat capacitor and a charged ball
10. The energy of a charged capacitor
11. Electric current. Density of current
12. Ohm's law for a section of a circuit. Resistance of conductors. Series and parallel connection of conductors
13. Electromotive force. Ohm's law for a complete circuit
14. Work and power of current. Law of Joule-Lenz. Efficiency of a current source
15. Magnetic interaction of currents. Lines of a magnetic field
16. Homogeneous magnetic field. Magnetic fields of an infinite conductor and a circular circuit with a current
17. Motion of charged particles in a magnetic field. Lorentz force
18. Ampere's law
19. The magnetic properties of matter. Magnetic permeability. Ferromagnetism
20. Induced electromotive force. Magnetic flux. Law of induced electromotive force
21. Lenz's rule. Self-induction phenomenon. Self-induced electromotive force
22. Inductance. Energy of the magnetic field of a coil with current
23. Force acting on a circuit with a current in an inhomogeneous magnetic field
24. Electromagnetic field
25. Free electromagnetic oscillations in a circuit. Energy conversion in an oscillating circuit. Natural frequency of oscillations in a circuit

Mechanics
Topics in Physics
1. Mechanical motion, path, displacement, velocity, and acceleration
2. Uniform and equal-variable rectilinear motion. Addition of velocities
3. Free fall of bodies. Acceleration of free fall
4. The motion of bodies thrown at an angle to the horizon

5. Uniform motion on a circle. Angular velocity. Centripetal acceleration
6. Newton's first law. Inertial reference frame. Galileo's principle of relativity
7. Mass. Force. Addition of forces. Torque
8. Newton's second law
9. Dynamics of translational and rotational motion of a material point
10. Conditions of equilibrium of bodies. Center of gravity and center of mass
11. Newton's third law
12. Forces of elasticity. Hooke's Law
13. Friction forces, coefficient of sliding friction
14. Gravitational forces. The law of universal gravitation. The force of gravity. The weight of a body
15. Motion of a body under the action of gravity. Motion of artificial satellites. Weightlessness. First space velocity
16. Momentum of a body. Impulse. Change in the momentum of a body as the result of the effect of an impulse
17. Law of conservation of momentum. Reactive motion. Concept of elastic and inelastic collisions
18. Mechanical work
19. Instantaneous and average powers
20. Kinetic and potential energies. Law of conservation of energy in mechanics. Principle of minimum potential energy
21. Pressure. Pascal's law for liquids and gases
22. Principle of hydraulic press. Atmospheric pressure. Variation of atmospheric pressure with altitude
23. Archimedes' force for liquids and gases. Conditions of floating bodies
24. Harmonic oscillations
25. Mathematical and physical pendulums
26. Forced oscillations, resonance
27. Sound waves. Velocity of sound. The volume of sound and the height of a tone

Thermodynamics
Topics in Physics

1. The concept of thermodynamic equilibrium
2. The thermodynamic state of a system, thermodynamic process
3. Temperature
4. Work done by a system when its volume changes
5. Quantity of heat. Heat capacity
6. Heat balance equation
7. First law of thermodynamics
8. The internal energy of a system
9. Equation of state of an ideal gas
10. The internal energy and heat capacity of an ideal gas
11. Isothermal, isobaric, isochoric, and adiabatic processes
12. Principle of operation of heat engines. The thermal efficiency of a heat engine and its maximum value
13. Carnot cycle. The thermal efficiency of the Carnot cycle
14. Carnot's theorem. Second law of thermodynamics

4. Recommended references

4.1. Reading list

Atomic, Molecular and Chemical Physics

Sources in English	**Topic**
Giancoli D.C. Physics. Principles withAplications. Pearson Education Inc. 2015. 983 p. URL: Physics: Principles with Applications, Global Edition (su.ac.rs)	*All topics*
Landsberg G.S. Elementary Texybook on Physics. Volume 3. Mir Publishers. 1989. 567 p. URL: Elementary Textbook On Physics Volume 3 : G. S. Landsberg (Ed.) : Free Download, Borrow, and Streaming : Internet Archive	*All topics*
Urone P.P., Hinrichs R. Physics. Openstax. Rice University. 2020. 836 p.URL: Physics-WEB_Sab7RrQ.pdf (d3bxy9euw4e147.cloudfront.net)	*All topics*

Sources in Russian	**Topic**
Мякишев Г.Я., Синяков А.З. Физика: Оптика. Квантовая физика. М. Дрофа, 2002. 464 с. URL: Том5(Оптика. Квантовая физика).pdf (vk.com)	*All topics*
Пинский А.А., Кабардина О.Ф. Физика 11 класс. М. Просвещение, 2011. 416 с. URL: Учебник по физике 11 класс Пинского Кабардина читать онлайн (uchebnik-tetrad.com)	*All topics*
Яковлев И.В. Электронный учебник физики. URL: Электронный учебник физики (mathus.ru)	*All topics*

Optics

Sources in English	**Topic**
Giancoli D.C. Physics. Principles withAplications. Pearson Education Inc. 2015. 983 p. URL: Physics: Principles with Applications, Global Edition (su.ac.rs)	*All topics*
Landsberg G.S. Elementary Texybook on Physics. Volume 3. Mir Publishers. 1989. 567 p. URL: Elementary Textbook On Physics Volume 3 : G. S. Landsberg (Ed.) : Free Download, Borrow, and Streaming : Internet Archive	*All topics*
Urone P.P., Hinrichs R. Physics. Openstax. Rice University. 2020. 836 p.URL: Physics-WEB_Sab7RrQ.pdf (d3bxy9euw4e147.cloudfront.net)	*All topics*

Sources in Russian	**Topic**
Мякишев Г.Я., Синяков А.З. Физика: Оптика. Квантовая физика. М. Дрофа, 2002. 464 с. URL: Том5(Оптика. Квантовая физика).pdf (vk.com)	*All topics*
Пинский А.А., Кабардина О.Ф. Физика 11 класс. М. Просвещение, 2011. 416 с. URL: Учебник по физике 11 класс Пинского Кабардина читать онлайн (uchebnik-tetrad.com)	*All topics*
Яковлев И.В. Электронный учебник физики. URL: Электронный учебник физики (mathus.ru)	*All topics*

Condensed Matter Physics

Sources in English	**Topic**
Giancoli D.C. Physics. Principles withAplications. Pearson Education Inc. 2015. 983 p. URL: Physics: Principles with Applications, Global Edition (su.ac.rs)	*All topics*
Landsberg G.S. Elementary Texybook on Physics. Volume 1. Mir	*All topics*

Publishers. 1988. 557 p. URL: Elementary Textbook On Physics Volume 1 : G. S. Landsberg (Ed.) : Free Download, Borrow, and Streaming : Internet Archive	
Nirenberg I., Kim J. Physics – Intermediate. CK-12 FlexBook. 2014. 578 p. URL: https://www.dropbox.com/scl/fi/48fj8gn00h43t7q866d69/Intermediate-Physics-Textbook-with-Solutions.pdf?rlkey=up34jqarnewipxqdij1z7sbyj&e=5&st=asozxx38&dl=0	*All topics*

Sources in Russian	**Topic**
Мякишев Г.Я., Синяков А.З. Физика: Молекулярная физика. Термодинамика. М. Дрофа, 2010. 349 с. URL: Том2(Термодинамика. Молекулярная физика).pdf (vk.com)	*All topics*
Пинский А.А., Кабардина О.Ф. Физика 10 класс. М. Просвещение, 2011. 431 с. URL: физика 10 Пинский (calameo.com)	*All topics*
Яковлев И.В. Электронный учебник физики. URL: Электронный учебник физики (mathus.ru)	*All topics*

Quantum Technologies

Sources in English	**Topic**
Giancoli D.C. Physics. Principles withAplications. Pearson Education Inc. 2015. 983 p. URL: Physics: Principles with Applications, Global Edition (su.ac.rs)	*All topics*
Nirenberg I., Kim J. Physics – Intermediate. CK-12 FlexBook. 2014. 578 p. URL: https://www.dropbox.com/scl/fi/48fj8gn00h43t7q866d69/Intermediate-Physics-Textbook-with-Solutions.pdf?rlkey=up34jqarnewipxqdij1z7sbyj&e=5&st=asozxx38&dl=0	*All topics*
Urone P.P., Hinrichs R. Physics. Openstax. Rice University. 2020. 836 p.URL: Physics-WEB_Sab7RrQ.pdf (d3bxy9euw4e147.cloudfront.net)	*All topics*

Sources in Russian	**Topic**
Мякишев Г.Я., Синяков А.З. Физика: Оптика. Квантовая физика. М. Дрофа, 2002. 464 с. URL: Том5(Оптика. Квантовая физика).pdf (vk.com)	*All topics*
Пинский А.А., Кабардина О.Ф. Физика 11 класс. М. Просвещение, 2011. 416 с. URL: Учебник по физике 11 класс Пинского Кабардина читать онлайн (uchebnik-tetrad.com)	*All topics*
Яковлев И.В. Электронный учебник физики. URL: Электронный учебник физики (mathus.ru)	*All topics*

Electrical Engineering and Electronics

Sources in English	**Topic**
Giancoli D.C. Physics. Principles withAplications. Pearson Education Inc. 2015. 983 p. URL: Physics: Principles with Applications, Global Edition (su.ac.rs)	*All topics*
Landsberg G.S. Elementary Texybook on Physics. Volume 2. Mir Publishers. 1988. 447 p. URL: Elementary Textbook On Physics Volume 2 : G. S. Landsberg (Ed.) : Free Download, Borrow, and Streaming : Internet Archive	*All topics*

Urone P.P., Hinrichs R. Physics. Openstax. Rice University. 2020. 836 p.URL: Physics-WEB_Sab7RrQ.pdf (d3bxy9euw4e147.cloudfront.net)	*All topics*

Sources in Russian	**Topic**
Мякишев Г.Я., Синяков А.З., Слободсков Б.А. Физика: Электродинамика. М. Дрофа, 2010. 476 с. URL: Том3(Электродинамика).pdf (vk.com)	*All topics except free electromagnetic oscillations in a circuit*
Мякишев Г.Я., Синяков А.З. Физика. Колебания и волны. М. Дрофа, 2010. 287 с. URL: Том4(Колебания и волны).pdf (vk.com)	*Free electromagnetic oscillations in a circuit. Energy conversion in an oscillating circuit. Natural frequency of oscillations in a circuit.*
Пинский А.А., Кабардина О.Ф. Физика 10 класс. М. Просвещение, 2011. 431 с. URL: физика 10 Пинский (calameo.com)	*All topics*
Яковлев И.В. Электронный учебник физики. URL: Электронный учебник физики (mathus.ru)	*All topics*

Mechanics

Sources in English	**Topic**
Giancoli D.C. Physics. Principles withAplications. Pearson Education Inc. 2015. 983 p. URL: Physics: Principles with Applications, Global Edition (su.ac.rs)	*All topics*
Landsberg G.S. Elementary Texybook on Physics. Volume 1. Mir Publishers. 1988. 557 p. URL: Elementary Textbook On Physics Volume 1 : G. S. Landsberg (Ed.) : Free Download, Borrow, and Streaming : Internet Archive	*All topics*
Urone P.P., Hinrichs R. Physics. Openstax. Rice University. 2020. 836 p.URL: Physics-WEB_Sab7RrQ.pdf (d3bxy9euw4e147.cloudfront.net)	*All topics*

Sources in Russian	**Topic**
Мякишев Г.Я. Физика. Механика. М. Дрофа, 2010. 495 с. URL: Физика. Механика. 10 класс. Профильный уровень. 2010. Мякишев : Геннадий Яковлевич Мякишев : Free Download, Borrow, and Streaming : Internet Archive	*All topics except: harmonic oscillations. Mathematical and physical pendulums. Forced oscillations, resonance. Sound waves. Velocity of sound. The volume of sound and the height of a tone.*

Мякишев Г.Я., Синяков А.З. Физика. Колебания и волны. М. Дрофа, 2010. 287 с. URL: Том4(Колебания и волны).pdf (vk.com)	*Harmonic oscillations. Mathematical and physical pendulums. Forced oscillations, resonance. Sound waves. Velocity of sound. The volume of sound and the height of a tone.*
Пинский А.А., Кабардина О.Ф. Физика 10 класс. М. Просвещение, 2011. 431 с. URL: физика 10 Пинский (calameo.com)	*All topics*
Яковлев И.В. Электронный учебник физики. URL: Электронный учебник физики (mathus.ru)	*All topics*

Thermodynamics

Sources in English	**Topic**
Giancoli D.C. Physics. Principles withAplications. Pearson Education Inc. 2015. 983 p. URL: Physics: Principles with Applications, Global Edition (su.ac.rs)	*All topics*
Nirenberg I., Kim J. Physics – Intermediate. CK-12 FlexBook. 2014. 578 p. URL: https://www.dropbox.com/scl/fi/48fj8gn00h43t7q866d69/Intermediate-Physics-Textbook-with-Solutions.pdf?rlkey=up34jqarnewipxqdij1z7sbyj&e=5&st=asozxx38&dl=0	*All topics*
Urone P.P., Hinrichs R. Physics. Openstax. Rice University. 2020. 836 p.URL: Physics-WEB_Sab7RrQ.pdf (d3bxy9euw4e147.cloudfront.net)	*All topics*

Sources in Russian	**Topic**
Мякишев Г.Я., Синяков А.З. Физика: Молекулярная физика. Термодинамика. М. Дрофа, 2010. 349 с. URL: Том2(Термодинамика. Молекулярная физика).pdf (vk.com)	*All topics*
Пинский А.А., Кабардина О.Ф. Физика 10 класс. М. Просвещение, 2011. 431 с. URL: физика 10 Пинский (calameo.com)	*All topics*
Яковлев И.В. Электронный учебник физики. URL: Электронный учебник физики (mathus.ru)	*All topics*

4.2. Recommended online courses

Atomic, Molecular and Chemical Physics

Online courses in English	**Link**	**Summary**
Modern Physics	https://www.youtube.com/watch?v=3lTQqEehEhI	The course covers current atomic and molecular physics
Nagwa	https://www.nagwa.com/en/eg/	Classes combine the best teaching with top-quality learning materials

		created by international subject matter experts
Understanding Modern Physics II: Quantum Mechanics and Atoms	https://www.classcentral.com/course/understanding-modern-physics-2-quantum-mechanics--56555	The course gives and overview of quantum mechanics and atomic physics

Online courses in Russian	**Link**	**Summary**
Вся квантовая механика (Comprehensive quantum mechanics course)	https://www.youtube.com/watch?v=1vXJtD4UNMY	Intensive course
Физика 10-11 класс (Physics 10-11 grade course)	https://www.youtube.com/playlist?list=PLBkPHBq30-t5yvip7c4m0qPRlFByohyL0	Classes 443-474.
Подготовка к ЕГЭ по физике (Training for the USE in physics)	*https://www.youtube.com/watch?v=eW5SLJ718i8&t=30s*	Intensive course

Optics

Online courses in English	**Link**	**Summary**
Nagwa	https://www.nagwa.com/en/eg/	Classes combine the best teaching with top-quality learning materials created by international subject matter experts
Optics 101 - Translating Theory into Practice	https://www.classcentral.com/course/youtube-optics-101-translating-theory-into-practice-125868	This course covers key concepts in optics such as the index of refraction, dispersion, reflection, interference, and polarization.
Optics and Modern Physics	https://www.edx.org/learn/ap/rice-university-ap-r-physics-2-part-3-optics-and-modern-physics?index=product&queryID=d7a08f73f7a83d81f9ecc0f57570cea2&position=7&results_level=second-level-results&term=Physics&objectID=course-b98d1098-9eda-466e-bcd8-e3bc0b819127&campaign=AP%C2%AE+Physics+2+-+Part+3%3A+Optics+and+Modern+Physics&source=edX&product_category=course&placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch	Course on optics and modern physics.

Online courses in Russian	Link	Summary
Оптика без формул (Optics without formulas)	https://physicsleti.ru/tuteline/view?N=130 To access the course, you need to log in to: https://www.physicsleti.ru/tuteline Use the guest login and password (login: guest, password: guest)	This course explores the fundamental principles of optics through hands-on experiences and visual demonstrations, focusing specifically on optical mirrors. Participants will learn about the behavior of light, reflection, and the various types of mirrors, all without the need for complex formulas. Through interactive activities, students will gain a deeper understanding of how mirrors function and their applications in everyday life.
Вся оптика (Comprehensive optics course)	https://www.youtube.com/watch?v=27g-gA4oX-Y	Intensive course
Физика 10-11 класс (Physics 10-11 grade course)	https://www.youtube.com/playlist?list=PLBkPHBq30-t5yvip7c4m0qPRlFByohyL0	Classes 391-427.

Condensed Matter Physics

Online courses in English	Link	Summary
Nagwa	https://www.nagwa.com/en/eg/	Classes combine the best teaching with top-quality learning materials created by international subject matter experts.
Fluid Mechanics I	*https://www.classcentral.com/course/youtube-fluid-mechanics-i-dr-biddle-s-lecture-series-53025*	This course focuses on the mechanics of fluids and the forces acting upon them. Participants will explore the principles governing fluid behavior, including concepts such as pressure, buoyancy, and flow dynamics. Through practical applications and theoretical discussions, students will gain a

		comprehensive understanding of how fluids interact with their environment and the forces that influence their movement.
Fundamentals of Fluid-Solid Interactions	https://www.classcentral.com/course/fsi-4880	The course describes the correlation between motion of fluids and solids.

Online courses in Russian	**Link**	**Summary**
Влажность и водяной пар (Humidity and water vapor)	https://www.youtube.com/watch?v=nXyqQALwTw8	Intensive course.
Физика 10-11 класс (Physics 10-11 grade course)	*https://www.youtube.com/playlist?list=PLBkPHBq30-t5yvip7c4m0qPRlFByohyL0*	Classes 132-138, 197-212
Основы физики конденсированного состояния (Basics of condensed matter physics)	https://www.youtube.com/watch?v=vzCiJbFjiS0&list=PLcsjsqLLSfNBi2DrK8PMq-wR8i6bg6gGg	14 Lectures on Condensed Matter Physics

Quantum Technologies

Online courses in English	**Link**	**Summary**
Modern Physics	https://www.youtube.com/watch?v=3lTQqEehEhI	The course covers current quantum mechanics.
Nagwa	https://www.nagwa.com/en/eg/	Classes combine the best teaching with top-quality learning materials created by international subject matter experts.
Understanding Modern Physics II: Quantum Mechanics and Atoms	https://www.classcentral.com/course/understanding-modern-physics-2-quantum-mechanics--56555	The course gives and overview of quantum mechanics and atomic physics.

Online courses in Russian	**Link**	**Summary**
Вся квантовая механика (Comprehensive quantum mechanics course)	https://www.youtube.com/watch?v=1vXJtD4UNMY	Intensive course.
Физика 10-11 класс (Physics 10-11 grade course)	https://www.youtube.com/playlist?list=PLBkPHBq30-	Classes 434-442.

	t5yvip7c4m0qPRlFByohyL0	
Подготовка к ЕГЭ по физике (Training for the USE in physics)	https://www.youtube.com/watch?v=xYG71kiY2lM&list=PL8a7SQ4e4Jc_oNwpwBcsrpVbtMqjJtk2v&index=1	Intensive course.

Electrical Engineering and Electronics

Online courses in English	**Link**	**Summary**
Physics	https://stepik.org/course/48615/promo?search=4670275215	This course is intended as a physics course for science and engineering students.
Nagwa	https://www.nagwa.com/en/eg/	Classes combine the best teaching with top-quality learning materials created by international subject matter experts.
Electricity and Magnetism	https://stepik.org/course/176257/promo	The course is aimed at studying the fundamentals of electricity and magnetism. During the course of the training, students get acquainted with the basic concepts and laws of electromagnetism.

Online courses in Russian	**Link**	**Summary**
Вся электростатика и электричество (Comprehensive electrostatics and electricity course)	https://www.youtube.com/watch?v=vUxSmHLarSQ	Intensive course.
Весь магнетизм (Comprehensive magnetism course)	https://www.youtube.com/watch?v=e6Zp9jo0r3I	Intensive course.
Все про самоиндукцию (Comprehensive self-induction course)	https://www.youtube.com/watch?v=2FzHBK8-OJY	Intensive course.
Все самое важное про электричество (Comprehensive electricity course)	https://www.youtube.com/watch?v=BhqSfeF-IOE&list=PLXZHT0P4aZno5OT5C8YtWlhnRCsVssE8R&index=2	Intensive course.
Все самое важное про магнетизм (Comprehensive magnetism course)	https://www.youtube.com/watch?v=BWIklu4u6-k&list=PLXZHT0P4aZno5OT5C8YtWlhnRCsVssE8R&index=3	Intensive course.
Физика 10-11 класс.	https://www.youtube.com/playli	Classes 213-310

(Physics 10-11 grade course)	st?list=PLBkPHBq30-t5yvip7c4m0qPRlFByohyL0	

Mechanics

Online courses in English	Link	Summary
Physics	https://stepik.org/course/48615/promo?search=4670275215	This course is intended as a physics course for science and engineering students.
Mechanical principles	https://stepik.org/course/65434/promo?search=4670275216	The course includes classes on applying the laws of mechanics to real-life engineering problems.
Mechanics: Motion, Forces, Energy and Gravity, from Particles to Planets	https://www.coursera.org/learn/mechanics-particles-planets	The course is recommended to the high school students, applicants and everyone interested in physics basics
Nagwa	https://www.nagwa.com/en/eg/	Classes combine the best teaching with top-quality learning materials created by international subject matter experts.

Online courses in Russian	Link	Summary
Классическая механика (Classical mechanics)	https://physicsleti.ru/tuteline/view?N=64 To access the course, you need to log in to: https://www.physicsleti.ru/tuteline Use the guest login and password (login: guest, password: guest)	Classical mechanics (different standards).
Кинематика (Kinematics)	https://www.youtube.com/playlist?list=PL-_cKNuVAYAXdifh3xW5BKyqxa_aZDlDo	Basic of kinematics.
Динамика (Dynamics)	https://www.youtube.com/watch?v=vNibcfQ1mVM&list=PL-_cKNuVAYAVbkGLmD2H6juqHcs0sWK1K	Basics of dynamics.

Всё про динамику за 2 часа (Comprehensive dynamics course in two hours)	https://www.youtube.com/watch?v=x28GxfC9-VQ	Intensive course.
Вся механика. (Comprehensive dynamics course)	https://www.youtube.com/watch?v=zC0gFhNgXVI	Intensive course.
Физика 10-11 класс. (Physics 10-11 grade course)	https://www.youtube.com/playlist?list=PLBkPHBq30-t5yvip7c4m0qPRlFByohyL0	Classes 12-131.

Thermodynamics

Online courses in English	**Link**	**Summary**
Physics	https://stepik.org/course/48615/promo?search=4670275215	This course is intended as a physics course for science and engineering students.
Introduction to Thermodynamics: Transferring Energy from Here to There	https://www.coursera.org/learn/thermodynamics-intro	Basic topics of thermodynamics.
Nagwa	https://www.nagwa.com/en/eg/	Classes combine the best teaching with top-quality learning materials created by international subject matter experts.
Online courses in Russian	**Link**	**Summary**
Бог МКТ и термодинамики (Kinetic theory of gases and thermodynamics expert course)	https://www.youtube.com/watch?v=xFgILHMnE3s	Intensive course.
Самое важное про молекулярную физику и термодинамику. (Comprehensive molecular physics and thermodynamics course)	https://www.youtube.com/watch?v=hTM26TSet8E&list=PLXZHT0P4aZno5OT5C8YtWlhnRCsVssE8R	Intensive course.
Всё про МКТ и газовые законы за 3 часа для ЕГЭ 2025 по физике (Kinetic theory of gases and gas laws comprehensive course)	https://www.youtube.com/watch?v=YJjXb2Dg-Mc	Intensive course.
Физика 10-11 класс. (Physics 10-11 grade course)	https://www.youtube.com/playlist?list=PLBkPHBq30-t5yvip7c4m0qPRlFByohyL0	Classes 145-186.