Federal State Autonomous Educational Institution of Higher Education "Moscow Institute of Physics and Technology (National Research University)"

APPROVED
Проректор по учебной работе и довузовской подготовке
A.A. Voronov

Work program of the course (training module)

course:	Physics. Laws of Conservation in Mechanics and Aerodynamics/Физика. Законы сохранения в механике и аэродинамике
major:	Applied Mathematics and Physics
specialization:	Beam-Plasma Systems and Technologies/Пучково-плазменные системы и технологии
	Phystech School of Aerospace Technology
	Chair of General Physics
term:	1
qualification:	Master

Semesters, forms of interim assessment:

1 (fall) - Grading test
2 (spring) - Grading test

Academic hours: 150 AH in total, including:
- lectures: 0 AH.
- seminars: 30 AH.
- laboratory practical: 120 AH.

Independent work: 75 AH.

In total: 225 AH, credits in total: 5

Author of the program: S.V. Serokhvostov, candidate of technical sciences, associate professor

The program was discussed at the Chair of General Physics 15.04.2021

Annotation

The course widely uses concepts and methods of mathematical analysis of functions of many variables and probability theory. These disciplines are studied in parallel with the general physics course. If a student comes across a mathematical concept that has not yet been studied in the framework of the mentioned mathematical courses, he must first familiarize himself with the corresponding section of mathematics on his own. The required minimum of mathematical information is presented both in lectures and in the main educational literature recommended for studying this discipline.

1. Study objective

Purpose of the course

Students master basic knowledge in the field of mechanics for further study of other branches of physics and in-depth study of the fundamental foundations of mechanics.

Tasks of the course

Tasks of the Discipline:

• formation of students ' basic knowledge in the field of mechanics

• formation of skills and abilities to apply the studied theoretical laws and mathematical tools to solve various physical problems

• * the formation of physical culture: the ability to distinguish the essential physical phenomena and to disregard the irrelevant; ability to conduct evaluations of physical quantities; ability to build a simple theoretical model is described serving the physical processes

2. List of the planned results of the course (training module), correlated with the planned results of the mastering the educational program

Mastering the discipline is aimed at the formation of the following competencies:

Code and the name of the competence	Competency indicators
UC-3 Organize and manage a team, and develop the team strategy to achieve the objectives	UC-3.1 Organize and coordinate the work of the project stakeholders and help resolve disputes and conflicts
Gen.Pro.C-1 Gain fundamental scientific knowledge in the field of physical and mathematical sciences	Gen.Pro.C-1.1 Apply fundamental scientific knowledge in the field of physical and mathematical sciences
Pro.C-1 Assign, formalize, and solve tasks, develop and research mathematical models of the studied phenomena and processes, systematically analyze scientific problems and obtain new scientific results	Pro.C-1.1 Locate, analyze, and summarize information on current research findings within the subject area

3. List of the planned results of the course (training module)

As a result of studying the course the student should:

know:

To know:

fundamental laws and concepts of mechanics, as well as the limits of their applicability:

 fundamentals of kinematics: radius-vector, velocity, tangential and normal acceleration, radius of curvature of the trajectory

 Newton's laws in inertial and non-inertial frames of reference

 laws of conservation of momentum, energy, momentum

 laws of motion of bodies in the gravitational field (Kepler's laws)

 laws rotational motion of a rigid body about a fixed axis and planar movement

 basis of the approximate theory of gyroscopes

 basic concepts of the theory of oscillations: the equation of harmonic oscillations and its solution, attenuation, q-factor of the oscillatory system

 basic concepts of the theory of elasticity and hydrodynamics

 fundamentals of special relativity: basic postulates, Lorentz transformations and their consequences, expressions for momentum and energy of relativistic particles be able to:

Be able to:

 apply the studied General physical laws to solve specific problems of mechanics:

 record and solve the equations of motion of the particle and the particle system, including the reactive motion

 to apply the conservation laws to solutions of problems of dynamics of particles, systems of particles or rigid bodies

 apply conservation laws in the study of elastic and inelastic collisions of particles, including relativistic ones

 calculate the parameters of orbits when moving in the gravitational field for the two-body problem

 apply the laws of mechanics to different reference systems, including non-inertial ones

 calculate the moments of inertia of symmetric solids and apply to them the laws of rotational motion

 to count the oscillation periods of various mechanical systems with one degree-new freedom, including fluctuations in solids

 analyze physical problems, highlighting the essential and non-essential aspects of the phenomenon, and on the basis of the analysis to build a simplified theoretical model of physical phenomena;

 apply various mathematical tools for solving problems based on the formulated physical laws, and carry out the necessary analytical and numerical calculations;

master:

To be in command of:

The main methods for solving problems in mechanics;

Basic mathematical tools pertaining to the problems in mechanics.

4. Content of the course (training module), structured by topics (sections), indicating the number of allocated academic hours and types of training sessions

4.1. The sections of the course (training module) and the complexity of the types of training sessions

№	Topic (section) of the course	Types of training sessions, including independent work			
		Lectures	Seminars	Laboratory practical	Independent work
1	Introduction. Laws of conservation in classical mechanics. Examples		3	5	4
2	Oscillations		3	5	4
3	Centre of inertia		2	5	4
4	Angular momentum		3	5	3
5	Collisions		2	5	4
6	Variable-mass systems. Jet propulsion		3	5	4
7	Hydrostatics and hydrodynamics		3	5	3
8	Maxwell distribution		3	5	4
9	Transport phenomena in gas		2	5	3
10	Thermodynmics. Heat capacity		2	5	4
11	Heat engines. Refrigerators		2	5	4
12	Enthropy and enthalpy		2	5	4
13	Determination of the bullet speed with the use of ballistic pendulum			8	4
14	Investigation of a Free Gyroscope Precession			8	4
15	Investigation of the steady flow in the tube			9	4
16	Determination of air viscosity by the velocity of the flow in thin tubes			8	4

17	Determination of the solid bodies' moment of inertia with the use of trafilerie suspension			9	5
18	Determination of the gravity acceleration with the use of reversible pendulum			9	5
19	Determination of the activation energy by the fluid viscosity temperature dependency			9	4
AH in total			30	120	75
Exam preparation		0 AH.			
Total complexity		225 AH., credits in total 5			

4.2. Content of the course (training module), structured by topics (sections)

Semester: 1 (Fall)

1. Introduction. Laws of conservation in classical mechanics. Examples

Main laws of conservation: mass, momentum, energy (kinetic and potential ones), angular momentum. Conditions for the conservation of these parameters.

2. Oscillations

Equation of oscillation and its derivation from the energy conservation law

3. Centre of inertia

Definition. Properties. Cjnsequences. Reduced mass. Application in solving the problems

4. Angular momentum

Conditions for the angular momentum conservation. Motion of a body with a fixed point. Celestial mechanics and laws of conservation. Giroscope

5. Collisions

Head-on collisions and non-head-on collisions. Absolutely elastic and absolutely inelastic collisions

6. Variable-mass systems. Jet propulsion

Meschersky equation. Tsiolkovsky equation. Jet engines. Airbreathing engines

7. Hydrostatics and hydrodynamics

Pascal law. Archimed law. Streamline and fluid tube. Bernoulli's law. Poiseuille formula. Stokes formula

8. Maxwell distribution

Maxwell distribution in one-, two- and three-dimensional cases. Characteristic velocities. Velocity of sound and Mach number.

9. Transport phenomena in gas

Molecule mean free path in gas. Number of collisions with wall. Diffusion. Viscosity. Thermal flux

10. Thermodynmics. Heat capacity

First law of thermodynamics. Work of gas. Internal energy. Heat capacity. Quasi-steady processe

11. Heat engines. Refrigerators

Cycles. Work in cycle. Carnot cycle. Efficiency

12. Enthropy and enthalpy

Second law of thermodynamics. Reversible and irreversible processes. Entropy. Gas flows and enthalpy

Semester: 2 (Spring)

13. Determination of the bullet speed with the use of ballistic pendulum

The flight velocity of a pellet fired from a pneumatic gun is measured using the ballistic pendulum method. The velocities are calculated from the amplitude of deviation of ballistic and torsional pendulums using the laws of conservation of momentum, energy and angular momentum.

14. Investigation of a Free Gyroscope Precession

Laws of motion of a fast rotating axisymmetric top (i.e. a gyroscope) are studied. The top rotation speed is determined by the precession rate under the influence of constant torque. The moment of inertia of the top is determined by the method of comparison of the top torsional oscillation period with the period of reference body oscillation. The friction torque in the gyroscope axis is measured by the tilting rate of the gyroscope axis.

15. Investigation of the steady flow in the tube

Properties of stationary flow of liquids and gases are studied. Liquid flow rate is measured by Pitot and Venturi flowmeters. Gas viscosity is measured based on the dependence of gas flow rate on the pressure drop in the pipe section. The deviation from Poiseil law determines the critical value of Reynolds number corresponding to the transition from laminar flow to turbulent flow.

16. Determination of air viscosity by the velocity of the flow in thin tubes

Mutual diffusion of air and helium through a thin tube connecting two vessels is investigated. The concentrations of gases are measured by a thermistor sensor by the difference in thermal conductivity of gas mixture. The applicability of Fick law and the dependence of mutual diffusion coefficient on pressure are studied.

17. Determination of the solid bodies' moment of inertia with the use of trafilerie suspension

Torsional oscillation periods of rigid bodies of different shape are measured with the aid of trifilar suspension. The measured periods are used to calculate the moments of inertia of the bodies, which are compared with those obtained by calculations based on geometric dimensions of the studied bodies. The additivity of inertia moments and the Huygens-Steiner theorem are checked experimentally.

18. Determination of the gravity acceleration with the use of reversible pendulum

Basic laws of oscillatory motion are investigated with a long rod-shaped physical pendulum and a revolving pendulum with movable loads. Pendulum oscillation periods are measured, and the dependence of the period on the amplitude of oscillation and attenuation is studied. The measured period of oscillation is used to calculate the acceleration of free fall with high accuracy.

19. Determination of the activation energy by the fluid viscosity temperature dependency

The viscosity coefficient of liquid as a function of temperature is measured by dropping the test balls in a vertical flask filled with glycerol. The Stokes formula for the viscosity of liquid is checked at a constant rate of falldown. The temperature dependence of viscosity determines the activation energy for the liquid molecules. The activation energy is compared to the bonding energy, evaporation heat and surface tension energy.

5. Description of the material and technical facilities that are necessary for the implementation of the educational process of the course (training module)

Facilities and Resources:
• A lecture audience equipped with a multimedia projector and a screen.
• Equipment for lecture demonstrations.
• Classrooms equipped with a board.
• Libraries of educational and technical literature, including electronic libraries, necessary for individual work of students.

6. List of the main and additional literature, that is necessary for the course (training module) mastering

Main literature

1. Механика [Текст] / Ч.Киттель,В.Найт,М.Рудерман ; пер.с англ.под ред.А.И.Шальникова,А.С.Ахматова .— 3-е изд.,испр. — М. : Наука, 1983 .— 448с.

2. Статистическая физика [Текст] : Т. 5 / Ф. Рейф ; 3-е изд., испр. ; пер. с англ. ; под ред. А. И. Шальникова, А. О. Вайсенберга .— М. : Наука, 1986 .— 336 с.

1. Сивухин Д.В. Общий курс физики. Т. II. Термодинамика и молекулярная физика. — М.: Физматлит, 2006.
2. Белонучкин В.Е., Заикин Д.А., Ципенюк Ю.М. Основы физики. Курс общей физики. Т. 2. Квантовая и статистическая физика / под ред. Ю.М. Ципенюка. Часть V. Главы 1–4. — М.: Физматлит, 2001.
3. Белонучкин В.Е. Краткий курс термодинамики. — М.: МФТИ, 2010.
4. Кириченко Н.А. Термодинамика, статистическая молекулярная физика. — М.: Физматкнига, 2012.
5. Щёголев И.Ф. Элементы статистической механики, термодинамики и кинетики. — М.: Янус, 1996.
6. Лабораторный практикум по общей физике. Т. 1 / под ред. А.Д. Гладуна. — М.: МФТИ, 2012.
7. Сборник задач по общему курсу физики. Ч. 1 / под ред. В.А. Овчинкина. — М.: Физматкнига, 2013.

Additional literature

1. Статистическая физика [Текст] : Т. 5 / Ф. Рейф ; пер. с англ. ; под ред. А. И. Шальникова, А. О. Вайсенберга .— М. : Наука, 1972 .— 352 с.

2. Механика [Текст] / Ч. Киттель, У. Найт, М. Рудерман ; пер.с англ. А. С. Ахматова [и др.] ; под ред. А. И. Школьникова, А. С. Ахматова .— 2-е изд., стереотип. — М. : Наука, 1975 .— 480с.

1. Рейф Ф. Статистическая физика (Берклеевский курс физики). Т. 5. — М.: Наука. 1972.
2. Ландау Л.Д., Ахиезер А.И., Лифшиц Е.М. Курс общей физики. — М.: Наука, 1965.
3. Базаров И.П. Термодинамика. — М.: Высшая школа, 1983.
4. Пригожин И., Кондепуди Д.. Современная термодинамика. От тепловых двигателей до диссипативных структур. — М.: Мир, 2009.
5. Коротков П.Ф. Молекулярная физика и термодинамика. — М.: МФТИ, 2009.
6. Корявов В.П. Методы решения задач в общем курсе физики. Термодина-мика и молекулярная физика. — М.: Высшая школа, 2009.
7. Прут Э.В., Кленов С.Л., Овсянникова О.Б. Введение в теорию вероятностей в молекулярной физике. — М.: МФТИ. 2002.
8. Прут Э.В., Кленов С.Л., Овсянникова О.Б. Элементы теории флуктуаций и броуновского движения в молекулярной физике. — М.: МФТИ., 2002.
9. Прут Э.В. Теплофизические свойства твёрдых тел. — М.: МФТИ. 2009.
10. Заикин Д.А. Энтропия. — М.: МФТИ, 2003.
11. Булыгин В.С. Теоремы Карно. — М.: МФТИ, 2012.
12. Булыгин В.С. Теплоёмкость и внутренняя энергия газа Ван-дер-Ваальса. — М.: МФТИ, 2012.
13. Булыгин В.С. Некоторые задачи теории теплопроводности. — М.: МФТИ, 2006.

7. List of web resources that are necessary for the course (training module) mastering

1. http://mipt.ru/education/chair/physics/S_II/method/ — методический раздел сайта кафедры Общей физики
2. http://lib.mipt.ru/catalogue/1412/?t=750 – электронная библиотека МФТИ, раздел «Общая физика»

8. List of information technologies used for implementation of the educational process, including a list of software and information reference systems (if necessary)

The List of Informational Resources:
1. Methodical section of the Department of General Physics website: http://mipt.ru/education/chair/physics/S_I/method/.
2. MIPT electronic library, the General Physics section: http://lib.mipt.ru/catalogue/1412/?t=750.
Lecture halls are equipped with multimedia and presentation facilities.
The recommended literature is available in electronic form (see paragraphs [1, 2] of the list of Internet resources necessary for mastering the discipline modules) so that the students may read textbooks using their tablets.

9. Guidelines for students to master the course

Guidelines for Students on Mastering the Discipline:
A student studying the general physics course must learn the general physics laws and concepts, and how to apply them in practice.
Successful mastering of the course requires intensive individual work of each student. The course program informs of the minimum time required for the student to work on the course topics. The individual work includes:
- reading and making summary of recommended literature,
- studying educational materials (lecture notes, educational and scientific literature), preparing answers to questions intended for self-study;
- solving the problems offered to students in lectures and seminars,
- passing assignments and preparing for seminars, tests, and exams.
Guidance and control of individual work is offered to students in the form of individual consultations.

The ability to solve problems is an indicator of the student's mastery of physics. To develop such ability, a student needs to solve as many problems as possible. When solving a problem, a student must be able to explain each action on the basis of the studied theoretical topics and carry out all the necessary calculations to bring the solution to a final answer. A problem is considered solved if it contains substantiated actions including references to the applicable physical laws and correct calculations, as well as the correct numerical answer (if the problem contains numerical data).

When preparing for a seminar, students must learn the basic concepts and laws to which the seminar will be devoted, and solve the problems envisaged for preparation to the seminar topic.

Physics makes use of many concepts and methods of calculus. If a student encounters a mathematical concept that has not yet been studied in the framework of mathematical courses then he/she must learn the relevant section of math individually. The necessary minimum of mathematical information is presented both at lectures and in the recommended literature.

The mid-semester control of knowledge is conducted in the form of a written test, in which the student is offered to solve five problems on the studied topics. The written test is given in the format similar to a written exam. In order to test the student's level of knowledge and understanding of the material, the teacher may ask the student, during the presentation of the assignment, additional theoretical questions on the syllabus or give additional problems to solve. Each student is required to complete, in a special notebook, the homework assignments and submit them for inspection.

At the written exam, the student is asked to solve five problems. The subjects of the problems are fully consistent with the physics course syllabus. However, all the problems in the written exam are completely non-typical. At the exam, students are allowed to use a sheet of paper with formulas written on it in advance. Such form of exam eliminates mindless memorization of formulas and is aimed at checking the depth of understanding of the material and the ability to apply physical laws in an unusual situation.

Students are recommended to study individually various topics related to general physics, possibly beyond the scope of the program, thus expanding their physical horizon. At the exam, the student is offered to present any theoretical or experimental topic prepared in advance and related to the course of physics. This can be either an in-depth presentation of one of the syllabus topics or a topic not covered in the syllabus, which can, however, be considered as part of the physics course studied, thus demonstrating the ability to understand various issues and problems of physics based on the use of general physical laws.

SUPPLEMENT

Assessment funds for course (training module)

major:	Applied Mathematics and Physics
specialization:	Beam-Plasma Systems and Technologies/Пучково-плазменные системы и технологии Phystech School of Aerospace Technology Chair of General Physics
term:	1
qualification:	Master

Semesters, forms of interim assessment:

1 (fall) - Grading test

2 (spring) - Grading test

Author: S.V. Serokhvostov, candidate of technical sciences, associate professor

1. Competencies formed during the process of studying the course

Code and the name of the competence	Competency indicators
UC-3 Organize and manage a team, and develop the team strategy to achieve the objectives	UC-3.1 Organize and coordinate the work of the project stakeholders and help resolve disputes and conflicts
Gen.Pro.C-1 Gain fundamental scientific knowledge in the field of physical and mathematical sciences	Gen.Pro.C-1.1 Apply fundamental scientific knowledge in the field of physical and mathematical sciences
Pro.C-1 Assign, formalize, and solve tasks, develop and research mathematical models of the studied phenomena and processes, systematically analyze scientific problems and obtain new scientific results	Pro.C-1.1 Locate, analyze, and summarize information on current research findings within the subject area

2. Competency assessment indicators

As a result of studying the course the student should:

know:

To know:
fundamental laws and concepts of mechanics, as well as the limits of their applicability:
 fundamentals of kinematics: radius-vector, velocity, tangential and normal acceleration, radius of curvature of the trajectory
 Newton's laws in inertial and non-inertial frames of reference
 laws of conservation of momentum, energy, momentum
 laws of motion of bodies in the gravitational field (Kepler's laws)
 laws rotational motion of a rigid body about a fixed axis and planar movement
 basis of the approximate theory of gyroscopes
 basic concepts of the theory of oscillations: the equation of harmonic oscillations and its solution, attenuation, q-factor of the oscillatory system
 basic concepts of the theory of elasticity and hydrodynamics
 fundamentals of special relativity: basic postulates, Lorentz transformations and their consequences, expressions for momentum and energy of relativistic particles

be able to:

Be able to:
 apply the studied General physical laws to solve specific problems of mechanics:
 record and solve the equations of motion of the particle and the particle system, including the reactive motion
 to apply the conservation laws to solutions of problems of dynamics of particles, systems of particles or rigid bodies
 apply conservation laws in the study of elastic and inelastic collisions of particles, including relativistic ones
 calculate the parameters of orbits when moving in the gravitational field for the two-body problem
 apply the laws of mechanics to different reference systems, including non-inertial ones
 calculate the moments of inertia of symmetric solids and apply to them the laws of rotational motion
 to count the oscillation periods of various mechanical systems with one degree-new freedom, including fluctuations in solids
 analyze physical problems, highlighting the essential and non-essential aspects of the phenomenon, and on the basis of the analysis to build a simplified theoretical model of physical phenomena;
 apply various mathematical tools for solving problems based on the formulated physical laws, and carry out the necessary analytical and numerical calculations;

master:

To be in command of:
The main methods for solving problems in mechanics;
Basic mathematical tools pertaining to the problems in mechanics.

3. List of typical control tasks used to evaluate knowledge and skills

1. In a room with a volume of V, a heater has been turned on for some time. As a result, the air temperature increased from T1 to T2. The pressure in the room has not changed. Find the change in the internal energy of the air contained in the room.
2. Find the work that a mole of air does, expanding from the volume V0 to 2V0 in an isothermal process at room temperature.
3. The air temperature is 273 K. Find the change in the speed of sound when the temperature changes by 1 K.
4. Calculate the efficiency of a cycle consisting of isobaric expansion, isochoric cooling and adiabatic compression, if the volume of gas decreases by 2 times in the adiabatic process. The working fluid is a diatomic ideal gas.
5. A heat engine with an unknown substance as a working fluid performs a reversible thermodynamic cycle, shown in the figure in TS coordinates. Find the efficiency of the cycle.

4. Evaluation criteria

1. Ideal and imperfect gases. Ideal gas pressure as a function of the kinetic energy of molecules. The relationship between the temperature of an ideal gas and the kinetic energy of its molecules.
2. Thermodynamic system. Microscopic and macroscopic parameters. Equation of state. Stationary, equilibrium and non-equilibrium states and processes.
3. Work, internal energy, warmth. The first law of thermodynamics.
4. Work of an ideal gas in equilibrium isothermal and isobaric processes. Internal energy of ideal gas.
5. Heat capacity. Heat capacities CV and CP. Heat capacities CV and CP of ideal gas. Mayer's formula.
6. Adiabatic and polytropic processes. The adiabatic and polytropic equation for an ideal gas.
7. Carnot cycle, efficiency of the Carnot machine. Karnot's theorems.

The mark given for the written exam depends on the problem solutions presented by a student. Each problem solution is evaluated according to a three-point grading scale, i.e. each solution is assigned from 0 to 3 points according to the following criteria:

3 points: The problem is solved completely and correctly, i.e. the correct well-founded solution is given and all questions of the problem are answered. Minor flaws may be present (a slip of the pen, or insignificant arithmetic errors).

2 points: The problem is solved, the logic of solution as a whole is correct but there are significant shortcomings (errors in calculations, an absurd answer, etc.).

1 point: The problem is not solved, but all the basic physical laws necessary for the solution are formulated correctly.

0 points: The problem is not solved or solved incorrectly (the basic laws are written with errors, or not completely, the approach to solving the problem is fundamentally wrong, or the solution to the problem does not match the statement).

The points for the five problems of written exam are summed up, the mark and the final score for the written exam are set according to the following scheme:

The sum of all points	Score	Mark
15	10	Excellent
13-14	9	
12	8	
11	7	Good
9-10	6	
8	5	
6-7	4	Satisfactory
5	3	
2-4	2	Unsatisfactory

The written exam score determines the maximum final score that a student may get at the oral exam. In exceptional cases, when the student demonstrates, during the oral exam, excellent theo-retical knowledge and superb level of understanding of the subject, the final score for the oral exam may be increased but no more than by two points (on a 10-point scale).

At the oral exam, the teacher will assess the student's answer as a whole and assign a mark ac-cording to the criteria set forth below and the above comments regarding the written exam score:

The mark "Excellent" (10 points) is given to a student who has shown comprehensive and sys-tematic knowledge of the syllabus and beyond, as well as the ability to confidently apply the knowledge in solving complicated non-standard problems.

The mark "Excellent" (9 points) is given to a student who has shown comprehensive and sys-tematic knowledge of the syllabus and the ability to confidently apply the knowledge in solving non-standard problems.

The mark "excellent" (8 points) is given to a student who has shown comprehensive and system-atic knowledge of the syllabus and the ability to confidently apply the knowledge in solving non-standard problems but who has allowed for some inaccuracies.

The mark "good" (7 points) is given to a student who has demonstrated firm knowledge and confident understanding of the syllabus and the ability to apply physical laws in solving typical problems.

The mark "good" (6 points) is given to a student who has demonstrated solid knowledge of the syllabus and the ability to apply physical laws in solving typical problems.

5. Methodological materials defining the procedures for the assessment of knowledge, skills, abilities and/or experience

Intermediate control of knowledge is carried out in the form of a test, in which the student is asked to solve five problems on the topics covered in a format similar to a written exam. To test knowledge, as well as understanding and mastery of the material, in the process of passing the assignments, the teacher can ask the student additional theoretical questions about the course program or give additional problems to solve. A prerequisite is the performance of household chores, which are drawn up in a notebook specially designated for this and are systematically submitted for verification.