《College Physics experiment》

Online course content arrangement and requirements

Attached experiment rules

Physics experiment teaching center , NPU

|  |  |  |  |
| --- | --- | --- | --- |
| Class | Content | curriculum requirements | Work at home |
| **Week 9**  **Class 1** | 1. Introduction：measuremnet, data process, experimental method  2.The form, content and requirements of online physics experiment class。  3. Interpretation of experiment 1: measurement of gravitational acceleration. | 1. Master the classification of measurement, error classification and processing methods, uncertain calculation methods, requirements for complete representation of results, concepts of significant numbers and requirements in measurement. | 1. Read the documents of experiment 1, and prepare the experimen materials;  2. Complete experiment 1 at home and take necessary photos and videos;  3. Complete the experiment report (see template 1) and send the electronic version to the teacher 2 days before the class of week 10;  4. Prepare the experiment PPT (about 3min, please refer to template 2). |
| **Week 10**  **Class 2** | 1. Show, answer and discuss the experiment 1.  2. Tell the second task of house experiment 2: measurement of lens focal length | 1.Master the principle, method, of measuring gravity acceleration by pendulum, use of meter and stopwatch, calculation of uncertainty. | 1. Fix errors in lab report 1.  2.Read the documents of house experiment 2, and prepare experimental materials；  3.Try to set up experiment 2 experiment system and make preliminary measurement. |
| **Week 11**  **Class 3** | 1.Interpretation of experiment 2:measurement of lens focal length.  2.Vedio experiment 1 ：Determination of Young's modulus of steel wire | 1. Understanding the basic methods of lens focal length measurement: object image distance method, conjugate imaging method, autocollimation method；  2.Understand the operation requirements of optical experiment and the adjustment of optical path: coaxial contour adjustment, successive approximation;  3. Grasp the meaning of young's modulus and its measurement method；  4.Master the principle of optical lever magnification to measure small geometric quantities | 1.According to the content of the class, improve the experimental system of experiment 2, adjust, measure, and take necessary photos and videos.  2. Complete the experiment report (see template 1) and send the electronic version to the teacher 2 days before the class of week 12；  3.Prepare the experimental PPT (about 3min, please refer to template 2). |
| **Week 12**  **Class 4** | 1.Show, answer and discuss the experiment 2.  2.Arrange the house experiment 3：Moment Inertia via Trilinear Torsion Pendulum | 1.Master the basic methods of lens focal length measurement: object image distance method, conjugate imaging method, autocollimation method；；  2.Master the operation requirements of optical experiment and the adjustment of optical path: coaxial contour adjustment, successive approximation;； | 1. Fix the errors in the experiment 2 report.  2. Read and understand the documents of house experiment 3, and prepare experimental materials;  3. Try to set up the experimental system of experiment 3 and make preliminary measurements. |
| **Week 13**  **Class 5** | 1. Interpret the house experiment 3：Moment Inertia via Trilinear Torsion Pendulum  2.Vedio experiment 2：The Characteristics of Voltage and Current of Nonlinear Resistance。 | 1.Understand the meaning and basic properties of moment of inertia;  2. Understand the trilinear torsion pendulum structure and the principle of measuring the moment of inertia, the cumulative amplification method, and the horizontal adjustment operation;  3.Master the basic method of volt-ampere characteristic curve measurement, the elimination of systematic errors, the use of basic electrical instruments, the connection method of circuit wiring, the method of drawing and processing data. | 1.According to the content of the class, improve the experimental system of experiment 3, adjust, measure, and take necessary photos and videos.  2. Complete the experiment report (see template 1) and send the electronic version to the teacher 2 days before the class of week 14；  3.Prepare the experimental PPT (about 3min, please refer to template 2). |
| **Week 14**  **Class 6** | 1.Show, answer and discuss the experiment 3.  2.Arrange and explain house experiment 4: measuring Young's modulus of elastic filaments by means of optical lever amplification. | 1.To master the method and basic condition of measuring the moment of inertia of rigid body by trilinear torsion pendulum；  2.Master the law of fixed axis rotation, additivity, parallel axis theorem of rigid body；  3.Understand the method of measuring small elongation by means of optical lever amplification | 1.Read and understand the documents of house experiment 4, and prepare experimental materials；  2.Set up the experimental system of experiment 4 , adjust, measure, and take necessary photos and videos.  3. Complete the experiment report (see template 1) and send the electronic version to the teacher 2 days before the class of week 15；  4. Prepare the experimental PPT (about 3min, please refer to template 2) |
| **Week 15**  **Class 7** | 1.Show, answer and discuss the experiment 4.  2.Arrange and explain house experiment 5：measuring surface tension coefficient with saturatation height. | 1.Master the measurement of micro elongation by magnification method；  2.Master the method of processing data by successive differential method；  3.Master how to determine the error limit of measurement according to the actual situation；  4.Understand the principle of measuring liquid surface tension coefficient by saturation height method | 1.Read and understand the documents of house experiment 5, and prepare experimental materials；  2.Set up the experimental system of experiment 5 , adjust, measure, and take necessary photos and videos.  3. Complete the experiment report (see template 1) and send the electronic version to the teacher 2 days before the class of week 16；  4.Prepare the experimental PPT (about 3min, please refer to template 2) |
| **Week 16**  **Class 8** | 1.Show, answer and discuss the experiment 5.  2.Summary of the course。 | 1.Master the method of measuring surface tension coefficient with saturation height；  2.Master the method of eliminating parallax；  3.Summarize and evaluate | none |

Class rules

1. Do not be late or leave early for the experiment class. Those who are late for more than 15 minutes are considered to be absent from class.

2. Students who are absent 2 or more class, 1 or more experiment report , this course will be failed.

3. Prepare carefully before class, and make clear the purpose, principle, method and steps of the experiment.

4. Prepare the necessary experimental equipment in time before the experiment.

5. Do each experiment carefully and realistically, and complete the task on time.

6. Finish the experiment report on time and submit it to the teacher two days before the next class.

7. Timely made 3min experimental PPT (including principles, methods, steps, data processing, error analysis), and actively explained it in class.