PST101 Applied Physics

Course Information

Credits 3
Campus Washburn Institute of Technology
Address 5724 SW Huntoon
City/State/Zip Topeka, Kansas 66604
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Description
Applied Physics is a science course for students enrolled in technical fields. This course is designed for the student who needs a broad base of physics knowledge and the ability to apply those principles on the job. Applied Physics teaches basic physics principles in an application-oriented setting.

Textbooks
ISBN: 978-1-555-02353-3

Student Learning Outcomes:
A. Communicate effectively
B. Integrate technology
C. Learn effectively
D. Demonstrate cooperative teamwork skills
E. Apply safety in the workplace
F. Think critically and creatively
G. Demonstrate responsible work ethics

Competencies
1. Given two or more mechanical forces acting along the same line, determine the resultant force.
2. Given two of the following quantities in a mechanical rotational system, determine the third:
   1). Force  2). Lever arm  3). Torque
3. Given two of the following quantities in a fluid system, determine the third:
   1). Force  2). Area  3). Pressure
4. Given two of the following quantities in a fluid system, determine the third:
   1). Pressure  2). Height of fluid  3). Weight density of fluid
5. Given two or more voltage sources connected in series, determine the resultant voltage.
6. Given a temperature in either degrees Celsius or Fahrenheit, determine the equivalent temperature on the other scale.
7. Given two of the following quantities in a mechanical translational system, determine the third:
   1). Force    2). Displacement    3). Work

8. Given two of the following quantities in a mechanical rotational system, determine the third:
   1). Torque    2). Angular displacement    3). Work

9. Given two of the following quantities in a fluid system, determine the third:
   1). Pressure difference    2). Volume displacement    3). Work

10. Given two of the following quantities in an electrical system, determine the third:
    1). Voltage    2). Charge transferred    3). Work

11. Given two of the following quantities in a linear mechanical system, determine the third:
    1). Displacement    2). Elapsed time    3). Velocity

12. Given three of the following quantities in a linear mechanical system, determine the fourth:
    1). Initial velocity    2). Final velocity    3). Elapsed time    4). Acceleration

13. Given two of the following quantities in a rotational mechanical system, determine the third:
    1). Angular displacement    2). Elapsed time    3). Angular velocity

14. Given three of the following quantities in a rotational mechanical system, determine the fourth:
    1). Initial angular velocity    2). Final angular velocity    3). Elapsed time    4). Angular acceleration

15. Given two of the following quantities in a fluid system, determine the third:
    1). Volume of fluid moved    2). Elapsed time    3). Volume-flow rate

16. Given two of the following quantities in an electrical system, determine the third:
    1). Mass of fluid moved    2). Elapsed time    3). Mass-flow rate

17. Given two of the following quantities in an electrical system, determine the third:
    1). Charge transferred    2). Elapsed time    3). Current

18. Given two of the following quantities in a thermal system, determine the third:
    1). Heat energy transferred    2). Elapsed time    3). Heat-flow rate

19. Given two of the following quantities, determine the third:
    1). Mass of an object    2). Velocity of the object    3). Linear momentum of the object

20. Given two of the following quantities, determine the third:
    1). Moment of inertia of an object    2). Angular velocity of the object    3). Angular momentum of the object

21. Given two of the following quantities in fluid, electrical, and thermal systems, determine the third:
    1). Force like quantity    2). Rate    3). Resistance

22. Calculate the magnitudes of starting and sliding frictional forces, given the mass or weight of the object, the coefficients of friction, and the angle of incline.

23. Describe the difference in laminar and turbulent flow.

24. Given two of the following quantities, determine the third:
    1). Mass    2). Velocity    3). Kinetic energy

25. Given two of the following quantities, determine the third:
    1). Mass    2). Height    3). Potential energy

26. Given two of the following quantities, determine the third:
    1). Spring constant    2). Spring displacement    3). Potential energy

27. Given two of the following quantities, determine the third:
    1). Moment of inertia    2). Angular velocity    3). Kinetic energy

28. Given two of the following quantities, determine the third:
    1). Capacitance    2). Voltage    3). Potential energy

29. Given two of the following quantities in an energy system, determine the third:
    1). Work    2). Elapsed time    3). Power

30. Given two of the following quantities in an energy system, determine the third:
1). Force like quantity  2). Rate  3). Power
31. Given two of the following quantities in an energy system, determine the third:
   1). Input power   2). Output power   3). Efficiency
32. Calculate the ideal mechanical advantage of a specific pulley, lever, screw, wheel and axle, hydraulic press or lift, and electrical transformer.
33. Calculate the change in current in an ideal electrical transformer.
34. Given two of the following quantities, determine the third:
   1). Input energy   2). Output energy   3). Efficiency
35. Given the efficiency of all energy convertors used in an energy-conversion system, determine the overall system efficiency.
36. In a short paragraph describe how transducers are used in your technical program.
37. Translate transducer information into useful measurements.

Guidelines for Success

Assessment Plan
Assessment is an integral part of the educational process at Washburn Tech and accurate feedback is an important tool in continuously improving the institution’s technical programs. Students can expect to participate in assessment activities prior to entry into programs, within specific courses and following program completion for specific fields of study.

Attendance
Attendance is required. Material missed must be made up with instructor.

Disability
The Special Support Services (SSS) Office is responsible for assisting in arranging accommodations and for identifying resources at Washburn Institute of Technology for persons with disabilities. Qualified students with disabilities MUST register and provide documentation with the office to be eligible for services. New requests for accommodations should be submitted two months or more prior to the date services should begin; however, contact the SSS Office as soon as a need may arise. Depending on the accommodation request, four to eight week lead time may be needed for timely and effective provision of services. SSS coordinates and assist in arranging services it deems appropriate of eligible students on a case-by-case basis.

If you are a student with a disability that may substantially limit your ability to participate in this class and believe you will need accommodations, it is your responsibility to contact:

Special Support Services Coordinator
Phone:  785-228-6356
E-Mail: ssscoordinator@washburn.edu