آغا خان یونیورسٹی ایگزامینیشن بورڈ

AGA KHAN UNIVERSITY EXAMINATION BOARD

Pacing Guide for Teachers

PHYSICS

Grade XII

Theory

Number of weeks: 28

Number of periods per week: 5

Key Textbook: Punjab Curriculum and Textbook Board Grade XII Physics

Teacher Developer(s): Mohammad Misbahullah Qureshi and Syeda Shazia Ahmed

Institution(s): Aga Khan Higher Secondary School, Karachi and Habib Girls' Higher Secondary School, Karachi

Topic	Total Periods
11. Electrostatics	18

Sub-Topic	Range of SLOs	Periods (40 mins)
11.1 Electrostatics	11.1.1	1
11.2 Coulomb's Law	11.2.1-11.2.3	2
11.3 Electric Field and Electric Intensity	11.3.1-11.3.4	3
11.4 Electric Flux	11.4.1	1
11.5 Gauss's Law with its Applications	11.5.1-11.5.2	3
11.6 Electric Potential	11.6.1-11.6.6	3
11.7 Capacitor	11.7.1-11.7.5	4
11.8 Energy Stored in a Capacitor	11.8.1-11.8.2	1

Learning Resources

- Advanced Level Physics, (Seventh edition) by Nelkon and Parker.

Web Resources

https://www.youtube.com/watch?v=f_MZNsEqyQw

https://ophysics.com/em5.html

Suggested Activities and/or Formative Assessment

Activity 1

Show the video and ask students to discuss how both objects attract.

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
12. Current Electricity	22

Sub-Topic	Range of SLOs	Periods (40 mins)
12.1 Current Electricity	12.1.1-12.1.3	2
12.2 Resistance	12.2.1-12.2.5	2
12.3 Resistivity and Conductivity	12.3.1-12.3.6	4
12.4 Internal Resistance	12.4.1-12.4.6	4
12.5 Kirchhoff's Laws	12.5.1-12.5.3	3
12.6 Potential Divider	12.6.1-12.6.3	3
12.7 Balanced Potential	12.7.1-12.7.5	4

Learning Resource

- Sears and Zemansky's University Physics With Modern Physics by Hugh D. Young and Roger A. Freedman

Suggested Activities and/or Formative Assessment

Activity 1

Ask students to use the given circuit simulator and make circuits and determine different quantities e.g., current, voltage resistance etc.

https://phet.colorado.edu/en/simulations/circuit-construction-kit-dc

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
13. Electromagnetism	12

Sub-Topic	Range of SLOs	Periods (40 mins)
13.1 Current Carrying Conductor in a Magnetic Field	13.1.1-13.1.8	4
13.2 Force on a Moving Charged Particle	13.2.1-13.2.2	2
13.3 Cathode Rays Oscilloscope (CRO)	13.3.1	1
13.4 Current Carrying Rectangular Coils in a Uniform Magnetic Field	13.4.1-13.4.2	2
13.5 Electrical Instruments	13.5.1-13.5.4	3

Learning Resource

- Fundamentals of Physics, Volume 2, by David Halliday, Robert Resnick, Jearl Walker

Suggested Activities and/or Formative Assessment

Activity 1

The given simulation can be used in the classroom.

https://javalab.org/en/category/electricity_en/electromagnetism_en/

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
14. Electromagnetic Induction	11

Sub-Topic	Range of SLOs	Periods (40 mins)
14.1 Law of Electromagnetic Induction	14.1.1-14.1.3	2
14.2 Inductance	14.2.1-14.2.2	2
14.3 Energy Stored in an Inductor	14..3.1-14.3.2	1
14.4 Simple Alternating Current (AC) Generator, Direct Current (DC) Generator and Direct Current (DC) Motor	14.4.1-14.4.3	2
14.5 Transformer	14.5.1-14.5.5	4

Web Resource

Working Principle of DC Generator | [Electric Machine #1] - YouTube

https://ophysics.com/em11.html

https://ophysics.com/em10.html

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
15. Alternating Current	9

Sub-Topic	Range of SLOs	Periods (40 mins)
15.1 Root Mean Square Value (rms)	15.1.1-15.1.4	2
15.2 Alternating Current (AC) Circuits	15.2.1-15.2.2	2
15.3 Impedance	15.3.1	1
15.4 Three Phase AC supply	15.4.1	1
15.5 Electromagnetic Waves	15.5.1-15.5.3	3

Web Resource

Working Principle of DC Generator | [Electric Machine #1] - YouTube

Suggested Activities and/or Formative Assessment

Activity 1

For basic concept of induction: https://ophysics.com/em11.html

Activity 2

For the introduction of DC generator https://ophysics.com/em10.html

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
16. Physics of Solids	11

Sub-Topic	Range of SLOs	Periods (40 mins)
16.1 Classification of Solids	16.1.1-16.1.2	1
16.2 Mechanical Properties of Solids	16.2.1-16.2.6	4
16.3 Electric Properties of Solids	16.3.1-16.3.3	3
16.4 Super Conductors	16.4.1	1
16.5 Magnetic Properties of Solids	16.5.1-16.5.4	2

Learning Resource

- Sears and Zemansky's University Physics With Modern Physics by Hugh D. Young and Roger A. Freedman

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
17. Electronics	13

Sub-Topic	Range of SLOs	Periods (40 mins)
17.1 Electronics	17.1.1	1
17.2 Semiconductor Devices	17.2.1-17.2.12	7
17.3 Operational Amplifier	17.3.1-17.3.3	2
17.4 Digital System	17.4.1-17.4.3	3

Web Resource

https://tooabstractive.com/electronics/resources-for-learning-electronics-from-scratch/

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
18. Dawn of Modern Physics	17

Sub-Topic	Range of SLOs	Periods (40 mins)
18.1 Special Theory of Relativity	18.1.1-18.1.5	4
18.2 Quantum Theory	18.2.1-18.2.5	4
18.3 Photoelectric Effect	18.3.1-18.3.5	3
18.4 Compton's Effect	18.4.1-18.4.2	2
18.5 Dual Nature of Light	18.5.1-18.5.7	4

Web Resource

https://www.savemyexams.co.uk/a-level/physics/edexcel/17/revision-notes/9-thermodynamics/black-body-radiation/9-10-black-body-radiation/

https://www.youtube.com/watch?v=30KfPtHec4s

Activity 1

Teachers can pick questions from this website for Class assessment.

https://www.proprofs.com/quiz-school/story.php?title=chapter-26-special-theory-of-relativity

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
19. Atomic Spectra	11

Sub-Topic	Range of SLOs	Periods (40 mins)
19.1 Atomic Spectra, Spectrum of Hydrogen, Bohr's model of Hydrogen Atom	19.1.1-19.1.7	4
19.2 Emission Spectrum	19.2.1	1
19.3 Excitation and Ionization Potential	19.3.1-19.3.2	2
19.4 Inner Shell Transition and Characteristics	19.4.1-19.4.3	2
19.5 Lasers	19.5.1-19.5.2	2

Suggested Activities and/or Formative Assessment

Activity

A simulation can be used: (https://ophysics.com/m1.html)

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
20. Nuclear Physics	16

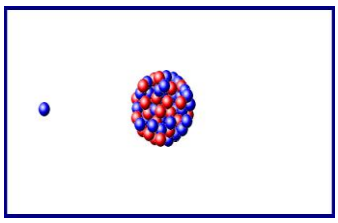
Sub-Topic	Range of SLOs	Periods (40 mins)
20.1 Composition of Atomic Model	20.1.1	1
20.2 Atomic Number, Mass Number, Isotopes and Isobars	20.2.1-20.2.2	1
20.3 Mass Spectrograph	20.3.1	1
20.4 Mass Defect and Binding Energy	20.4.1-20.4.2	2
20.5 Radioactivity	20.5.1-20.5.2	1
20.6 Law of Radioactive Decay	20.6.1-20.6.4	2
20.7 Detection of Ionizing Radiation	20.7.1-20.7.2	2
20.8 Nuclear Fission and Fusion	20.8.1	1
20.9 Nuclear Reactor	20.9.1-20.9.2	1
20.10 Nuclear Radiations and Exposure	20.10.1	1

20.11 Medical Physics	20.11.1-20.11.2	1
20.12 Basic Forces of Nature	20.12.1	1
20.13 Building Blocks of Nature	20.13.1	1

Suggested Activities and/or Formative Assessment

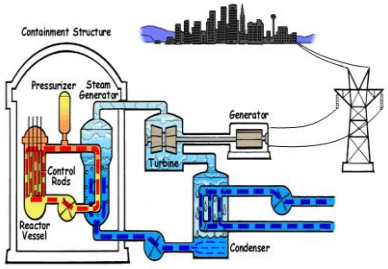
Activity 1

Show the animation and ask students to discuss how it is happening?



Activity 2

Show the animation of the nuclear reactor and ask to discuss about the procedure.



Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Note: This teacher-led pacing guide has been developed for AKU-EB affiliated schools to facilitate them by

- ensuring smooth transition of a school's academic year.
- ensuring curricular continuity in schools.
- predicting the time and pace of syllabi implementation.

This document also contains **suggested activities and/or formative assessments** that may enhance the learning experience. Please note that these activities are meant to serve as suggestions. As educators, you have the flexibility and autonomy to adapt and modify them to best suit the needs of your students and the dynamics of your classroom.

You are advised to use an ad-blocker while accessing the websites and web resources. In case any website is not functional for any reason, you may inform us at examination.board@aku.edu for an alternative or search material via any search engine.