

CURRICULUM DOCUMENTATION FOR IB DIPLOMA BATCH MAY 2011

Subject – Physics

July – August 2009

Topic	<p style="text-align: center;">July - Physics and Physical measurements August - Mechanics,</p>
No. of hours	<p style="text-align: center;">Physics and Physical measurements – 8 Hours Mechanics -- 21 Hours</p>
Content	<p>Physics and Physical measurements :-</p> <ol style="list-style-type: none"> 1. Realm of Physics - order of magnitude, known values of diff. sizes, ratio and estimation from everyday objects 2. Measurement and Uncertainties - systems of measurement, scientific notation, uncertainty in measurement, results and graphs 3. Vectors and Scalars - scalar and vector, sum and difference of vectors, components of a vector <p>Mechanics :-</p> <ol style="list-style-type: none"> 1. Kinematics – distance, displacement, speed, velocity, acceleration, graphs and numerical 2. Forces and dynamics - mass and weight, newtons laws of motion, equations of motion, momentum, impulse 3. Work, energy and power- work by constant and variable force, area of F-S graph, power, types of energy, conservation, elastic and inelastic collisions, efficiency 4. Uniform circular motion- derivation using vectors, identifying different forces, numerical
Reference and handouts	<p>Books – Physics by Giancoli , Physics by Tim Kirk</p> <p>CD - www.crocodile-clips.com</p> <p>Question papers – IB CD for last five years papers</p> <p>Websites : www.phet.colorado.edu, www.peep.ac.uk , www.occ.ibo.org, www.freeexampapers.com, www.scilinks.org, www.curriki.org</p>
TOK aspects	<ol style="list-style-type: none"> 1. Realm of Physics : Discussion on old methods of measurement, their shortcomings and latest techniques

	<p>2. Measurement and Uncertainties : Data and its limitations is a fruitful area for discussion</p> <p style="text-align: right;">This also offers an opportunity to show how spread sheets are commonly used to calculate and draw error bars on graphs (Aim 7)</p> <p>3. Forces and dynamics: The development of Laws of Motion raises interesting issues relating to correlation, cause and scientific theories. Data logging in practical work and computer simulations can be explained. (Aim7)</p>
Teaching aids	Video, power point presentation, apparatus
Assessment	MT1

Sept - Oct. 2009

Topic	<p>September - Thermal Physics</p> <p>October - Oscillations and Waves</p>
No. of hours	<p>Thermal Physics -- 9 Hours</p> <p>Oscillations and Waves - 17 Hours</p>
Content	<p>Thermal Physics:-</p> <p>1. Thermal Concepts – temperature, diff. scales of temp., internal energy, mole, Avogadro constant Thermal properties of matter:- specific heat capacity, thermal heat capacity, latent heat, explanation in terms of molecular behavior, evaporation and boiling Kinetic model of an ideal gas- pressure, assumptions of kinetic theory, temperature and kinetic energy, macroscopic behavior of an ideal gas</p> <p>Oscillations and Waves:-</p> <p>1. Kinematics of simple harmonic motion – displacement, amplitude, frequency, phase difference, equations of SHM, solving problems graphically and by calculation</p> <p>2. Energy changes during SHM- kinetic and potential energy, equations of energy, solving problems</p> <p>3. Forced oscillations and resonance – damping, Natural and forced frequency, resonance,</p> <p>4. Wave characteristics – pulse and wave, progressive wave, longitudinal and transverse wave, displacement time graph, speed, frequency and wavelength</p> <p>5. Wave properties – reflection of waves and Snell’s law, diffraction and interference, principle of superposition</p>
Reference and handouts	<p>Books – Physics by Giancoli, Physics by Tim Kirk</p> <p>CD - www.crocodile-clips.com</p> <p>Question papers – IB CD for last five years papers</p> <p>Websites : www.phet.colorado.edu, www.peep.ac.uk , www.occ.ibo.org, www.freeexampapers.com, www.scilinks.org, www.curriki.org,</p>

<p>TOK aspects</p>	<p>1.Kinetic model of a gas: The use of modeling in science can be introduced here There are many computer simulations of the behavior of gases. (Aim 7)</p> <p>2.Oscillations and Waves: Many computer simulations are available for oscillations (Aim 7)</p> <p style="text-align: right;">Role of electricity in our life and the future of electricity generation and demand is a broad topic for discussion</p>
<p>Teaching aids</p>	<p>Video, power point presentation, apparatus</p>
<p>Assessment</p>	<p>MT1</p>

Nov.-Dec 2009

Topic	November - Electric currents, field and forces
No. of hours	Current, field and forces -- 13 Hours
Content	<p>Electric currents</p> <ol style="list-style-type: none"> 1. Electric potential difference, current and resistance – potential difference, potential energy, electron volt, current, resistance, ohm’s law, power and numericals 2. Electric circuits - EMF, internal resistance, series and parallel combination, potential divider, sensors, problems on circuits <p>Field and forces:-</p> <ol style="list-style-type: none"> 1. Gravitational force and field – Gravitational law, gravitational field strength, expression for gravitational field strength, numerical 2. Electric force and field:- charges, conservation of charges, electric field due to a charge and group of charges, sketch and numerical 3. Magnetic force and field- Moving charge and field, mag. Field due to current, direction of force on a moving charge and current carrying conductor, problems
Reference and handouts	<p>Books – Physics by Giancoli, Physics by Tim Kirk</p> <p>CD - www.crocodile-clips.com</p> <p>Question papers – IB CD for last five years papers</p> <p>Websites : www.phet.colorado.edu, www.peep.ac.uk , www.occ.ibo.org, www.freeexampapers.com, www.scilinks.org, www.curriki.org,</p>

TOK aspects	1. Electric currents : Data and its limitations is a fruitful area for discussion 2. Field and forces: The concept of fields in sciences is worth exploring
Teaching aids	Video, power point presentation, apparatus
Assessment	TE1

Jan-Feb. 2010

<p style="text-align: center;">Topic</p>	<p style="text-align: center;">Atomic and Nuclear Physics – 19 Hours</p>
<p style="text-align: center;">Content</p>	<p>Atomic and Nuclear Physics :-</p> <p style="padding-left: 40px;">1. Atomic Structure – atomic model, evidence supporting nuclear model, limitation, atomic energy levels, atomic no., mass no., isotopes, interaction in a nucleus - 2 Hours</p> <p style="padding-left: 40px;">2. Radioactive Decay – radioactive decay, types of radiations and properties, stable and unstable nuclei, half life, decay curve, numericals - 3 Hours</p> <p style="padding-left: 40px;">3. Nucleur reactions, fission and fusion – artificial transmutation, nucleur reactions, atomic mass unit, mass energy equivalence, binding energy, problems involving binding energy and mass defect, fission and fusion, fusion in sun and stars, numerical on fission and fusion reactions - 4 hours</p>
<p style="text-align: center;">Reference and handouts</p>	<p>Books – Physics by Giancoli, Physics by Tim Kirk</p> <p>CD - www.crocodile-clips.com</p> <p>Question papers – IB CD for last five years papers</p> <p>Websites : www.phet.colorado.edu, www.peep.ac.uk , www.occ.ibo.org,</p>

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TOK aspects	1. Atomic and Nuclear Physics : There are opportunities throughout this topic to look at databases, use spreadsheets, explore simulations, and perform data logging experiments (Aim 7)
Teaching aids	Video, power point presentation, apparatus
Assessment	MT2

Mar-Apr. 2010

<p>Topic</p>	<p>March – Energy</p> <p>April – Power and climate change</p> <ol style="list-style-type: none">1. Energy degradation and power generation – conversion of thermal energy to work, degraded energy, energy flow diagram, mechanism of power production - 2 Hours2. World energy sources - identify energy sources, renewable and nonrenewable sources, energy density, choice of fuel, proportion of world energy sources, advantages and disadvantages of different sources. <p>April - Fossil fuel power production, Green house effect, global warming</p> <p>Extended essay plan and working</p> <p>Group IV project</p>
<p>Reference and handouts</p>	<p>Books – Physics by Giancoli, Physics by Tim Kirk</p> <p>CD - www.crocodile-clips.com</p> <p>Question papers – IB CD for last five years papers</p> <p>Websites : www.phet.colorado.edu, www.peep.ac.uk , www.occ.ibo.org, www.freeexampapers.com, www.scilinks.org, www.curriki.org</p>
<p>TOK aspects</p>	<p>International efforts to reduce the enhanced</p>

	greenhouse effect
Teaching aids	Video, power point presentation, apparatus
Assessment	MT2

May. 2010

Revision

Extended Essay

August 2010

Topic	August - Sight and wave phenomena
No. of hours	Relativity - 15 hours
Content	Sight and wave phenomena:- The eye and sight, standing waves, Doppler effect, diffraction, resolution, polarization
Reference and handouts	Books – Physics by Giancoli, Physics by Tim Kirk CD - www.crocodile-clips.com Question papers – IB CD for last five years papers Websites : www.phet.colorado.edu , www.peep.ac.uk , www.occ.ibo.org , www.freeexampapers.com , www.scilinks.org , www.curriki.org

TOK aspects	Computer simulations can be very helpful in illustrating the different ideas in this option.
Teaching aids	Video, power point presentation, apparatus
Assessment	MT3

Sept - Oct. 2010

Topic	September, October - Quantum Physics, Nuclear Physics
No. of hours	Quantum Physics, Nuclear Physics - 15 hours
Content	Quantum Physics, Nuclear Physics – quantum nature of radiation, wave nature of matter, atomic spectra, nuclear physics Extended essay draft
Reference and handouts	Books – Physics by Giancoli, Physics by Tim Kirk CD - www.crocodile-clips.com Question papers – IB CD for last five years papers Websites : www.phet.colorado.edu , www.peep.ac.uk , www.occ.ibo.org , www.freeexampapers.com , www.scilinks.org , www.curriki.org

TOK aspects	This option raises fundamental philosophical problems related to the nature of observation and measurement. The concept of paradigm shift can be developed here.
Teaching aids	Video, power point presentation, apparatus
Assessment	MT3

Nov.-Dec 2010

Topic	November, December - revision Extended essay second draft
No. of hours	Revision - 28 hours