**APPLIED Science & Technology (STA406) Curriculum Mapping 2018-2019**

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|  | **Topic** | **Depth** | **Time** | **Comments** Dates based on 2015-2016 | |
| Intro | **Demo:** Petroleum Ether ramp |  |  |  | |
| **TERM 1** | **Chapter 5**  Electricity   * Electrical charge * Static Electricity & electrical conductivity * Ohm’s law * Circuits * Power & electrical energy   Magnetism   * Attraction & repulsion * Magnetic field of a live wire * Magnetic field of a solenoids * Electromagnetic induction | Detailed with calculations of V=IR, and Power and Energy. | Sept (statics & electricity calculations)  mid-Oct  (electro-magnetism) | **Assignments:**  Assignment #1 – Statics (Sept. 10)  Assignment #2 – Using formulae (Sept. 18)  Assignment #3 – Magnets, electromagnets & compasses (Oct. 18)  Extra worksheets for in-class work  **Labs/Demo:**  **Static & Dynamic Electricity**  -Van der Graaf  -Activity: Building a battery  -Build circuits with light bulbs, switches and circuit boards with increasing difficulty  Lab #1 Circuit Board investigation (Sept. 30)  Lab #2 Reading resistors lab (Oct. 6)  Lab #3 Finding strength of unknown resistor. (Oct. 15)  **Electromagnet demos/labs:**  -Magnetic field with iron fillings.  -Lab with straight line conductors & electromagnets to show compass direction and electromagnets with increasing strength  -Field induction Demo  **Project:** Building a Scrap Metal Collector  Due end October mark 🡪 term1. (Oct 30)  **Quizzes**: Quiz #1 static (Sept. 11)  Quiz #2 Dynamic electricity (Oct. 3)  **Tests:** Test #1 Statics (Sept 23)  Test #2 Electricity & magnetism(Oct 16) | |
|  | **Halloween demo : starch + metabisulfite** | | | | |
| **TERM 2** | **Chapter 14**  Electrical Engineering   * + Power supply   + Conduction, insulation & protection   + Typical controls   + Resistor colour bands   + Transformation of energy in a light bulb and stove element   + Other functions | Quick overview, mostly covered in Chapter 5 | End- Oct/Nov | | **Assignments**:  Assignment #0 - Match the symbols optional  Assignment #1 – Electrical engineering (Nov. 6)  **Labs:**  Lab #1 Breadboard basics (Nov. 4)  Lab #2 “circuits” from Tracy \* needs fixing but good, done without circuit board.  Lab #3 Remote control tested with breadboards (enrichments activity)  Series of labs: Start with LEDs finish with complex circuits (LED, Buzzer, etc)  **Quiz** Electrical Engineering (Nov. 6)  **Tests:** Electrical Engineering (Nov 14) |
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|  | **Chapter 3**  Energy   * Law of conservation of energy * Energy efficiency formula * Heat vs temp   Motion & Forces & Fluids   * Force * Type of force * Equilibrium of two forces * Relationship between constant speed, distance & time * Mass & weight * Archimedes’ principle * Bernoulli’s principle * Pascal’s law | Focus on calculations of energy efficiency.  Detailed with calculations of forces and v=d/t | Nov  Dec | | **Chapter 3**  **Labs**:  Energy Lab. Demo in lab of different types of energy.  Energy effic. Lab with heating coil. optional  Lab #1Build a “boat” out of aluminum foil (mid/end Nov)  Lab #2 Cartesian diver (Pascal’s & Archimedes) (mid/end Nov)  **Lab #3 Bernoulli –Walk behind gliders**  **Assignments**:  Assignment #1 – Ch 3 Velocity, Force & efficiency. (Nov. 23 & 29)  **Quiz**  Ch 3 Nov 24  **Test** – Ch 3 only Dec 8 |
| Christmas Break | | | | | |
|  | **Chapter 4**  Changes in Matter   * Chemical changes (combustion & oxidation) * Methods to prevent rusting   Particle model |  | Mid Dec | | **Chapter 4**  Assignment #1 – Ch 4 Changes in Matter (Dec 17)  **Quiz Ch 4 Dec 17**  **Test – did not test on Ch4 included in ch 12 test** (Jan. 15)  **Labs**: Lab #1 Chemical reactions lab (Dec anytime depending on availability) |
| Mock ~ Jan 28  Last week of Jan – Exam review | | | | | |
| Exams | | | | | |
| **TERM 3** | Technical World  **Chapter 12**  Materials   * Constraints (deflection & shearing) * Characteristics of mechanical properties * Heat treatments * Types & properties (plastics, ceramics, composites) * Modification of properties (degradation, protection)   Manufacturing   * Shaping (characteristics of drilling, tapping, threading & bending) * Measurement & inspection (direct measurements, control, shape & position)   Graphical Language   * Multiview orthogonal projection * Functional dimensioning * Developments * Standards & representations | Very qualitative and descriptive, Do not spend too much time on “types of materials” or “manufacturing”  Need a workshop to demonstrate  Detailed, spend time drawing technical objects | Jan  Can be started before exams. | | **Chapter 12**  **Labs & Demos:**  Examples of wood, modified wood, metals, ceramics etc.  Lab #1 Classification of plastics lab (optional)  Plastics versus paper bag debate  Drawing assignments in class, lots of practice  **Assignment:**  Assignment #1 – constraints & properties (Jan. 15)  **Quiz** (varies in Jan if combined with ch 4 if not Feb. 20 depending on placement of midyear)  **Tests** – Ch12 (end Jan. or after midyear)  **Project**: Building of Windmill in shop. Done when shop is available usually March/April |
| **TERM 3** | **Chapter 13**  Mechanical Engineering   * Adhesion & friction of parts * Linking of mechanical parts * Degrees of freedom * Guiding controls * motion transmission & transformation systems * Speed changes (gear ratios) * Resisting torque & engine torque | Detailed on links and motion transformation and transmission and gear ratios | Feb/March  (finish before break) | | **Chapter 13**  use bicycle as example  links practical test  **Assignment**– Ch 13 (March 15)  **Labs:**  Lab #1 Gear ratios varies \*\*\*MUST ADD MORE COMPOUND GEARS!  Lab #2 Build a wind turbine + assessment  Links Lab test (March 8)  **Quiz** – Ch 13 links, degrees of freedom, gears (end Feb. early March)  **Test**  – ch13 March 18  **Projects:**  Poster: Mouse Trap Racers need 4-5 classes  Done in April while doing ch6 (mostly review from previous grades) |
|  | **Chapter 6**  Lithosphere   * Minerals and rocks * Energy resources * Contamination   Hydrosphere   * + Catchment area   + Energy resources | Qualitative  Focus on energy resources | March (after break)  April | | **Chapter 6**  **Assignments**: varies according to exam info doc  **Quiz** lithosphere & Mohs scale (April 13)  **Test** – lithosphere & hydrosphere April 14 can be combined with Ch 7  **Labs**  Rock identification (optional)  **Project idea (optional)**  PowerPoint presentations of energy resources and/or jobs in Science.  **Field trip to Aviation Museum “Let’s talk energy” April 27** |
|  | **Chapter 7**  Atmosphere   * Air mass * Cold front/warm front * Cyclone & anticyclone * Energy resources   Space   * + Solar energy flow   + Earth-moon system (gravitational effect)   + Tides and tidal energy | Focus on energy resources | End April | | **Chapter 7**  Gravitational effect and moon/tides  Tidal generator  Debate on energy resources  **Assignment** #1 – atmosphere (April 19)  Atmospheric layers poster (optional)  **Test** – atmosphere & space April 28  **Demo Cloud chamber** |
|  | **Chapter 8, 10**  Dynamics of Ecosystems   * Disturbances * Trophic relationships * Primary productivity * Material & energy flow * Decomposers * Chemical Recycling * Factors that influence distribution of biomes * Ecosystems | Focus on levels  Energy loss  Reading webs  Very qualitative |  | | **Chapter 8, 10**  **Depth covered depends on Exam Information document received in Feb.**  Outside study (section off area of forest)  Pond study  Rotting log study  **Owl pellets ?????**  Water filter lab  **Assignment**  Ecosystems (May 5)  No Test |
| **Exam** | *Lab Exam – based on Ch5*  *"MEES” Exam* | **3-4 weeks practice and review**  **3 mock exams are marked** | | | |