DAKOTA HIGH SCHOOL

Mechatronics 1A / 1B - COURSE SYLLABUS 2019-2020

Instructor: Mr. Jomo Walker
Email: jwalker01@cvs.k12.mi.us
Website: https://www.chippewavalleyschools.org/academics/cte/mechatronics-and-robotics/
Telephone Number: (586) 723-2700
Classroom #: 145
Office Hours: By appointment
Planning Room: 160

Length: 2 Hour - 1 Year **Credit:** 2.0

Text: Grob's Basic Electronics; Mitchel E. Schultz, Basic Robotics; Keith Dinwiddie, Industrial Hydraulics Student Curriculum Level 1, Book 1 & 2; Depco

Online Text Book Link: http://connect.mheducation.com/class/j-walker-electronics

Software: Festo FluidSim, Festo EZ Veep, Depco Studio, Rockwell Automation RS Logix 500, Falstad Circuit, AutoCAD 2016, Inventor 2016, FPV trainer and Microsoft Office Products

COURSE DESCRIPTION

Students study analog and digital electronics in this introductory mechatronics course. Electrical engineering basics, such as sensors, programming, controllers, microprocessors and basic mechanical systems will also be covered.

METHODOLOGY

The following methods of instruction will be used in this course:

- Hybrid learning using on-line and hands on instruction utilizing the Depco/Festo
- Pre-Engineering curriculum for pneumatics, electronics, sensors, Material Handling
- Instructor led lectures and labs using Rockwell Automation 140oE Programmable Logic Controller
- systems integrated with Depco/Festo MecLab systems
- Instructor led lectures and labs using Arduino microcontroller systems and C++ code
- Design projects using basic knowledge of electronics, pneumatics and Arduino Microcontrollers

PREREQUISITES

General CAD and mathematics knowledge.

CURRICULUM OUTLINE (not listed in order of chronology of delivery)

Segment 1: Systems Integration / Mechatronics
Segment 2: System Design/Prototype/CADD
Segment 3: Electrical / Motor Controls / VFD / Servo Sensor Driven
Segment 4: Mechanical
Segment 5: Control Systems/Electrical controls
Segment 6: PLC/Diagnostics
Segment 7: Fluid Power/Pneumatics
Segment 8: Robotics
Segment 9: Electronics/Sensors
Segment10: Manufacturing/Machining/CNC
Segment 11: Quality/Measurements
Segment12: Blueprint/Schematics/Drafting

Work Based Learning

Students will gain Work Based Learning experience by visiting companies in our local area.

Student Leadership (CTSO)

Students will have the opportunity to join the Academy of Model Aeronautics club. The students will gain leadership experience by running the club themselves while they learn how to build and fly drones. (All club

meetings take place during normal school hours)

ARTICULATION AGREEMENT

Eligible students could qualify for tuition-free (articulated) college credit at Macomb Community College.

SUPPLIES FOR CLASS (recommended but not provided)

- Notebook
- Headphones
- Flash Drive

PROJECT FEES / ASSOCIATED COSTS

Students are not charged lab fees associated with projects as all materials and supplies are normally funded by the CTE department of Chippewa Valley Schools. Students may incur additional costs for specific projects that go above and beyond the standard scope of the original project. These costs apply if they choose to pursue fabrication capabilities or parts supplies outside of the fabrication lab.

EVALUATION and ASSESSMENT

Students will be evaluated and assessed by: written testing, oral presentations, demonstrations, participation, and hands-on performance (drawing on the computer). Students will also give a self-evaluation.

GRADING SCALE

A	100 -95	B-	83 - 80	D+	69 - 67
A-	94 - 90	C+	79 - 77	D	66 - 64
B+	89 - 87	C	76 - 74	D-	63 - 60
B	86 - 84	C-	73 - 70	F	59 & Below

- **Extra Credit Policy:**
  - If original credit is complete then extra credit will be provided. 10% of the total points available is the maximum allotted extra credit.
- **Homework Policy:**
  - Lab work, in-class work and appropriate in-class time is supplied for assignments due to the nature of curriculum delivery. All "home" work assigned will have fully defined due dates and criteria.
- **Late Work Policy:**
  - All late work will be penalized 20% per day late. No work will be accepted after 5 days.
- **Reassessment Policy:**
  - Daily lab assignments develop mastery of knowledge and may be resubmitted for grade improvement. Actual assessments or project based learning assessments are singular events.
- **Testing Reference Material:**
  - All student resources may be available for test taking, such as; binder portfolios, notes, prior work, industry reference materials.

ACADEMIC INTEGRITY POLICY

The primary rule in this professional class is ***RESPECT***. It applies to all aspects of the class. If you are wondering if something is allowed or will be tolerated ask yourself where the word respect is involved in the action. Remember, this class is a privilege - not a requirement.

The following actions will not be tolerated whatsoever and will be cause for permanent removal with a failing grade from this design technology program. These rules and guidelines are in addition to the school handbook and district policies.

- **Cheating / Academic dishonesty in any form.**
  - Examples:
    - Taking someone else's work and using it for your own / sharing your work.
    - Copying or allowing copying of files / drawings.
    - Tampering with someone's project or work.
    - Deleting files from other student's directory.

- **Destruction of lab equipment of any form.**
  - Examples:
    - Cutting or damaging the workstation surface.
    - Damaging the PC and any of its components.

- The damage, removal / disassembly of any part of the lab furniture, or any part of the PC and its components including wires and cables.

Unauthorized Internet usage could result in ***permanent removal of computer privileges*** in the lab. Internet usage will only be allowed upon instructor approval. *A failing grade in Mechatronics work will result*.

Unauthorized software application use or installation will result in ***permanent removal of computer privileges*** in the lab. *A failing grade in Mechatronics work will result*.

Unauthorized access to the inner workings of the software of the PC system (**hacking**) or installing any software, changing the background of the desktop, changing the computer time or date, installing games, using the network for unauthorized communication or storage, or accessing the C: drive will result in ***permanent removal of computer privileges*** in the lab. *A failing grade in Mechatronics work will result*.

ATTENDANCE

Active attendance in the class is a valuable and integral part of the student's grade. Attendance in school is the responsibility of the student and his/her parents or guardian. Attendance has a bearing on academic achievement and will reflect in a student's grade. Excessive absence or tardiness, whether excused or unexcused, can result in a failing grade during the marking period or semester.

STATE OF MICHIGAN CTE SEGMENTS

- See curriculum outline