Electronics 1

Room: 138

Teacher: Mr. Jennings

Contact: jjennings@naperville203.org

Prerequisites: Algebra 1

Grade level: Freshman - Senior

Dual Credit: College of DuPage ELECT 1100 and ELECT 1101 - six college credits.
***Students must opt-in for college credits*, see below for more information.**

Additional help: Additional help is always available. Please feel comfortable asking for additional help or lab time. SOAR Support is the best time for additional support and access to the lab. If needed, other arrangements can be made for additional support before school, during lunch, or after school.

Course Description:

This two semester course covers essential concepts in electronic circuit theory and application. The course is designed for those students who have an interest in technology and engineering. The course begins with an introduction to electrical properties, electrical quantities, and electronic component behavior - components such as resistors, switches, capacitors, diodes, LEDs, transistors, and the 555 timer will be studied. Next, circuit analysis and design are studied through Ohm's Law and Watt's Law with application to series, parallel, and combination circuits. Follow-on topics include the study of magnetism, electromagnetism and related AC circuit behavior. Lastly, students study the design and operation of diodes, transistors, digital electronics, and microcontrollers (Arduino) and their applications in more complex semiconductor and digital circuits. Throughout the year, students will learn to use various types of electronic laboratory equipment and processes including power supplies, digital multimeters, function generators, oscilloscopes, breadboarding, prototyping, and soldering while performing laboratory experiments and engineering challenges that accompany the studied topics. Students will also experience the engineering design process which includes circuit design, modeling/simulations, fabrication, and troubleshooting. For many students, this will be their first exposure to engineering, design, and troubleshooting. The course will challenge your tenacity, your ability to think complexly, and your ability to solve engineering challenges - all in a collaborative, nurturing, and supportive environment.

At Naperville Central, we value every Redhawk's unique perspective and contribution to our classroom and school community. To maximize growth in academic and interpersonal skills, we

are renewing our focus on three key aspects of community involvement at Naperville Central: attendance, responsible use of technology in classrooms, and respectful language use.

Be Present

- In person class time is valuable and Redhawks are expected to be in attendance, on time, and present for the entire duration of each class period.
- Redhawks demonstrate their commitment to the classroom community by being present and ready to learn.
- Being present allows for community learning experiences, which prepares Redhawks to meet future goals and develop the essential skills of collaboration, communication, and accountability.

Be Engaged

- By limiting unnecessary digital distractions, Redhawks become better listeners and thinkers, more focused, productive, and connected to others around them. Devices will remain stored for the duration of each class period unless explicitly aligned to instruction and permitted by the teacher.
- Redhawks will store their cell phones and earbuds in their bag or designated location upon entering the classroom.
- Being engaged means the individual is wholly present in the learning environment and not everywhere all at once (on social media, in text conversations, outside the classroom, etc).

Be Respectful

- At NCHS, every person is respected and valued. Being respectful communicates a desire to create communities that honor and celebrate self and others, build the skills necessary to access a successful future, and problem solve individual and community needs.
- Redhawks respect themselves and our community by using language that is appropriate for a school and professional setting. Language that threatens harm or is negative about a person's race, ethnicity, sexual orientation, languages they speak, religion, ability, and/or gender will not be tolerated.
- All areas of our campus are learning spaces and a reflection of Redhawk pride. We demonstrate appropriate actions and take personal responsibility for the care of other people, spaces, equipment, and shared resources.

Units of Study

Semester One	Semester Two
Safety	**Unit 8: Magnetism and Electromagnetism**
Unit 1: Introduction to Electricity and Electrical Quantities	**Unit 9: Alternating Current**
Unit 2: Engineering Notation, Resistor Color Codes, and Digital Multimeters	**Unit 10: Semiconductors - Diodes**
Unit 3: Ohm's Law, Watt's Law, Breadboards, and Power Supplies	**Engineering Challenge #3**
Unit 4: Electronic Components	**Unit 11: Semiconductors - Transistors**
Unit 5: Soldering	**Digital Electronics**
Engineering Challenge #1	**Engineering Challenge #4**
Unit 6: Multiload Circuits and Circuit Analysis	**Unit 12: Arduino**
Engineering Challenge #2	

Electronics Essential Standards Assessed

Safety:
I can identify, interpret and perform necessary safety precautions when using tools and materials.

- **Equipment and Materials.**
    - **I can identify, interpret, and perform essential working processes for tools, and materials.**

- **Disciplinary Literacy:**
    - **I can effectively communicate using Electricity, Electronics, and Engineering specific content knowledge.**
    - **I can use the correct Electricity, Electronics, and Engineering vocabulary to effectively communicate ideas, concepts, and knowledge.**
    - **I can read and draw Electricity and Electronics specific diagrams.**
    - **I can measure and interpret Electrical quantities.**

- **The Engineering Design Process:**
    - **I can effectively apply the Engineering Design Process to design, fabricate, problem solve, troubleshoot, and persevere.**

Grading Practices

Semester grades for all classes (prior to the final exam) will be calculated by a weighted average

As part of the calculation for the overall semester grade, the final exams will be 10% of the semester grade.

90% Evidence: Assessments in this course include unit quizzes and engineering challenges. Summative feedback is provided to the student and considered evidence of a student's level of proficiency on a given standard or skill**.**

A zero on a summative assessment will only indicate that no attempt was made by the student. If a legitimate attempt is made on an assessment (as defined by your teacher), a score of 50% will be the lowest possible grade. Students will be eligible for the 50% floor through timely and consistent completion of all practice work and formative work.

10% Practice: Tasks that are connected to course standards and learning targets that promote the development of skills and/or knowledge that will be assessed and where feedback is provided. This may include, but is not limited to daily readings, note taking, practice exercises (labs), and tasks essential to the learning process.

How grades will appear in Infinite Campus

This course utilizes a model of grading where students are issued a grade in points to represent a student's level of proficiency aligned with specific standard(s), skills, or content.

The points will vary by assignment and grading will reflect the student's completeness and correctness of the assignment. Larger summative work projects will be worth more points, while formative work is meant to check knowledge along the way and will be worth a lower number of points and therefore a lower total points toward their grade.

Reassessment

The purpose of reassessment is to allow students to demonstrate proficiency of course standards in which they remain deficient.

Determination of Reassessment Eligibility

- The assessment included multiple opportunities for feedback and improvement in the process for the final product OR formative assessments are aligned to standards, allow students to practice in the same assessment format, and gain feedback for improvement before the summative assessment.
- There was timely and consistent completion of practice work and formative assessments.
- A one-time performance on an assessment does not reflect the student's level of proficiency leading up to the assessment.
- Summative assessment score is below 85%.

Not eligible for reassessment

Eligible for reassessment

Reassessment Parameters

- The reassessment opportunity will require designated learning experiences that demonstrate readiness as assigned by the teacher.
- Reassessments MUST be completed within 5 school days of the student receiving feedback unless otherwise determined by the instructor. The reassessment deadline should be communicated in an IC comment.
- The final reassessment score will be capped at 85%.

Attendance

In person class time is valuable and Redhawks are expected to be in attendance, on time, and present for the entire duration of the class period.

Attendance for field trips

Students must notify their instructors in advance of all field trips. Some instructors require assignments that must be handed in prior to the absence. A teacher may deny participation in a field trip for academic reasons. If this occurs, the student will attend scheduled classes. According to the field trip guidelines, there is a limit of three field trips per class, per semester.

Make-up Work Resulting from an Absence

Students who are absent are encouraged to check Canvas and talk with their teachers to request any missed assignments or class information. If an absence extends beyond three consecutive days, families should contact the student's counselor for additional support and coordination. It is the student's responsibility to follow-up with each teacher about missed work.

The amount of time students are given to complete work after an excused

absence is determined by the number of school days missed due to that absence. For example, if a student missed two school days, they will have two school days to submit the missed work.

Truancy and Disciplinary Procedures

Some assignments may have due dates communicated in advance. If a student is absent on the day a major assignment is due, but the absence is excused, the expectation remains that the assignment is submitted on the original due date, no later than the period the class meets, unless alternate arrangements are made in advance with the teacher.

Make-up privileges are not granted for truancy or any unexcused absence.

Truancy means that a student is not in attendance for 20 minutes or more of their scheduled class or classes, and there is no ‘excused’ reason for the absence. When a student is truant they receive a referral and will be seen by a Dean or Dean’s Assistant, who will assign consequences. Consequences range from conferring with the Dean to the assignment of detentions and may include a truancy ordinance ticket, referral to Regional Office of Education, and withdrawal from class without credit. Continued infractions have a cumulative effect in terms of disciplinary action. Truant absences and absences exceeding the allowable cap have no make-up privileges.

Technology Expectations

Every student will be expected to store their cell phone in a designated location throughout each class period as defined by the academic department. Cell phones should not be seen or heard in the classroom setting. Appropriate use of cell phones is allowed during passing periods, study halls, at lunch, before and after school. Cell phone use is strictly prohibited in locker rooms and restrooms at all times.

The use of earbuds and headphones are prohibited in the classroom unless permission has been granted by the teacher. Earbuds and headphones should not be seen or heard in the classroom setting.

Students are required to use their District 203 issued Chromebook and will not be permitted to use personal laptops or devices in the classroom setting. Student personal devices are not protected by district systems and put student safety and the safety of our network at risk. Additionally, student personal devices are not enabled with applications and programs necessary for administration of state and advanced placement assessments.

School Appropriate Language	If you witness or experience harm involving any member of this classroom community—whether intentional or unintentional—please let me know so I can help address and resolve the situation appropriately.
Naperville Central AI Belief Statement	At Naperville Central High School, we strive to build a learner's mindset in all students, developing qualities such as adaptability, communication, critical thinking, and global citizenship. Generative Artificial Intelligence (AI), offers new opportunities to engage with important technology relevant to the future that also raises significant educational considerations. AI tools provide unique ways to engage students in the learning process, hence we encourage our staff to guide students in using AI responsibly. Teachers have the authority to establish guidelines for AI use in their classrooms, setting clear expectations for how AI can be used on learning tasks. Concurrently, we recognize that reliance on AI risks replacing genuine student engagement and original thought, undermining the attributes we aim to cultivate. Striking a balance between leveraging AI tools effectively and maintaining educational standards is crucial to the learning experience of each student.
Academic Integrity	Violations of academic integrity policy will be consequenced by administration in collaboration with the Department Chair and teacher.

Course Safety

Maintaining safety in the classroom and on the job is imperative. Learning and developing excellent safety habits begins in the classroom and continues into the employment arena. The best suggestion for practicing safe habits is to **THINK** before acting. As part of the program of study you will be operating electronic equipment, test equipment, and soldering irons. Therefore, I ask that you read and understand the following class safety rules completely:

- Always wear safety glasses when soldering or cutting.
- Always warn nearby students of a hot solder iron and always keep the solder iron in its holder when not in use.
- Always use the one hand method when working with unknown voltages.
- Always clean up your lab area and return all tools and equipment.
- The student will be responsible for any equipment damage caused by neglect, carelessness and/or rowdiness.

Required Materials

- Scientific calculator - TI-83 or TI-84
- Chromebook - everyday
- Writing utensil – everyday
- All other materials and course supplies will be provided.

Communications

- Students are encouraged to communicate with their teacher regarding questions.
- Your teacher will make every effort to respond to emails and phone calls within 24 hours during the school week.
- The best way to communicate with your teacher is in person during your class period. The second best way to communicate with your teacher is through email. If you haven't received an email reply within 48 hours, please resend the email or call my voicemail. Your email may have been filtered.

Family Partnerships

School and family partnerships provide students with the best opportunities to succeed.

Some ways families can support their student's learning include:

- Actively check Infinite Campus for their student's grades.
    - Infinite Campus is a tool to progress monitor student work until the final course grade is posted.
    - Monthly progress grades are posted and represent the current grade of a student in the course at that moment in time.
- Discuss missing assignments and due dates, help organize folders, materials, assignment notebooks, and discuss current learning, projects, and assessments.

Dual Credit

This course is dual credited with the College of DuPage, courses ELECT 1100 and ELECT 1101. **Students must opt-in/enroll** in the dual credit program to receive the college credit at the end of the semester. **Students are not automatically enrolled into the dual credit course, you must register.** Registration information will be available during the first week of the semester for **each semester**. With parental approval, every student is expected to enroll in the dual credit option.