

MELTEC 225
Residential Wiring - Course Syllabus

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Course Scope

Residential Wiring is an entry level course meant to introduce students enrolled in the Electrical Certificate of Achievement pathway to the electrical trade. Through a concentrated effort of 16 weeks, student will develop basic skills and understanding to immediately engage in practical endeavors. This class will show students how to work following safe working practices, to safely use measurement instruments, to use the most common tools of the trade wiring circuits, to design typical circuits used in dwellings, and students will be introduced to the practical use of the National Electrical Code.

Student Learning Outcomes

At the end of this course the student will be able to:

1. Define ratings and/or dimensions for all main components of one-family and multifamily dwelling electrical system: Service Entrance, main disconnects and protections, panel boards, diverse branch circuits with their component parts.
2. Generate a bill of materials, that may include costs, for one complete one-family dwelling project.
3. Perform with acceptable levels of workmanship operations aimed to wire basic and advanced circuits typical of residential electrical systems such as basic lighting circuits, 3 and 4 way switches, basic motor wiring, different types of NEMA receptacles, including basic security and communication wiring.

Bibliography

Required: **Residential Wiring**, Harvey N. Holzman, The Goodheart-Willcox Company Inc.

Course Structure

Throughout the semester, the student will learn the principles of wiring, will apply electrical theory and NEC rules to size protections, wires, and wiring methods, and will learn basic rules for load estimation.

The lecture segment of the class, usually the first class of a week or the first block of the class, will be focused on wiring principles such as brief surveys of materials used in electrical installations, application of electrical theory and NEC rules, and examples of applications. The lab segment of the class, usually the second class of a week or the second block of the class, will be used for demos, lab activities, and - if needed - review of wiring principles relative to the activities.

The instruction will be delivered in thematic blocks that will be evaluated in summative assessments.

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Attendance prior and after Census Day

Attendance will be taken daily. Regular attendance is essential to ensure success in this course and that laboratory procedures are clearly understood.

Students must email giving notice to the instructor if they are planning to miss a class before the end of second week (prior to census day) to avoid being dropped from the course. After the second week, it is the student responsibility to drop this course. If after the second week, and before the completion of the 75% of the course, a student stops attending but forgets to drop the class, the instructor could, unintentionally, overlook the situation and fail to drop the student from the roster. In such case, the final grade will be likely an "F". However, a student showing a pattern of several consecutive missed assignments can be interpreted as a permanent absence in which case the instructor may drop the student without giving previous notice.

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Lab Requirements

A safe laboratory environment is essential. Safety procedures are most often given during the lecture period. If, in the opinion of the instructor, you are unaware of the proper safety procedures for a particular laboratory exercise because of excessive absences, you may not be allowed to participate in that exercise. These labs will be developed in a shop-like environment. Therefore, it will be neither a playground nor a freewill space. Workplace rules apply, and the instructor will work both as instructor and supervisor. In such character, the instructor will explain how to perform tasks and will not intervene in the class dynamic unless it is evident that the group is having difficulties. Good results are expected within a reasonable time frame according to different situations.

Most of the labs are designed as a team endeavor; groups of two or three persons will work together. Differences of character might arise and, as it happens in a real work environment, these differences will have to be put aside in order to achieve the successful completion of the work at hand. A professional attitude in front of differences is a calm and cold analysis of the problem, looking for a solution and not for the self-satisfaction of "being the winner" of a discussion. The quality of the team effort will be a factor for a positive evaluation on the lab.

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As was previously said, workplace rules apply, such as:

1. **Be on time**
2. **Come ready**
 - a. Read the lab material ahead of time,
 - b. Bring your notes (class notes and questions) and your basic class gear (notebook, calculator, pen, pencils, permanent marker)
3. **After a lab-demo and general indications are delivered, do not spring into action immediately; plan your work and set your area.**
4. **If a difference of opinions with your team arises, avoid quarrels and discuss differences calmly**
5. **Stop 5 to 10 min before the end of the class and clean your area**

You'll be provided with tools, instruments, and safety glasses (better have your own, it is more hygienic). However, it is recommended to have:

1. Safety glasses,
2. Gloves,
3. Working shoes or boots (preferable type "EH"),
4. Tape measure,
5. Permanent marker,
6. A 12" square,
7. A 1/8" straight-head slot screwdriver,

*It is **STRONGLY** recommended to have the tetanus vaccine. Students Health Services delivers the shot for a minimum fee. Also, let your instructor know if you suffer from any heart or blood condition that might compromise you in case of cuts or accidental shock.*

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Grading Criteria

Class Participation

Being on-time, staying on-task, and keeping engaged in the subject, although it leaves a large margin for subjectivities from the point of view of the student and the instructor, is going to be considered and awarded. "Class Participation" includes punctuality, readiness, engagement with the subject, cooperation, and team spirit. It will be rewarded with 5 points. Students with leadership that help others to master technical issues may be awarded with 1 extra-credit point in this item.

Class Participation accounts for 5% of the final grade.

Homework

HW is divided between two different types of assignments: Online assignments and estimation problems.

- Most homework assignments will be done online using Canvas, including some numerical problems.

- Estimation problems also are posted on Canvas, but they are meant to be printed and turned in with their solution according to schedule.
 - Students able to work documents digitally will be able to do these assignments in .DOC, .DOCX, .ODT, or .PDF formats and email them to the instructor

The schedule of the deadlines for assignments will be set accordingly to the development of the class and posted on Canvas.

For each hour of lecture two hours of home study are expected, therefore students should plan 5 hours per week of dedicated time for reading and completing assignments.

Usually, the deadline for HW will be seven to ten days after it is officially assigned; in that way students will have plenty time to consult the instructor prior to “turning in” HW. Homework is not a medium to test but to consolidate understanding. Students can and should ask about difficulties that they encounter in assignments, as well as show the instructor drafts of written assignments prior to turning them in. Homework is the best tool to identify what is not clear and make it crystal clear. Homework is meant to learn and not to test.

Using Canvas Learning Management System makes studying and doing homework virtually ubiquitous; all that it takes is a digital device (computer, laptop, tablet, or smart phone) and an Internet connection. Students will be able to take school virtually wherever there is Internet access. For the digitally literate, even written assignments could be done digitally. Some students may have difficulties working with a digital medium, but they will receive support in the form of training to manage digital resources. Students with material limitations when it comes to accessing devices and digital resources will receive orientation on how to get support from the College and the Community in order to overcome these limitations. The world and the workplace are turning more and more into a digital space and the classroom must follow in order to prepare students for new professional requirements.

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HW accounts for 25% of the final grade

Labs

Labs are expected to be completed within the timeframe specified when the class agenda is set, but periods of catch up will be available to complete tasks. Basically, labs will be evaluated based on their functionality and their completion with a reasonable level of craftsmanship. Work ethic and teamwork are factors that will affect the overall evaluation of the lab. There are some less subjective matters on the evaluation of the development of labs such as:

1. Methodicalness – proved through measurement charts or field notes
2. Prompt functionality
3. Completeness – proved through the completion of tasks requested by the lab guide
4. Neatness in the project, the work space, and the related documentation.

Labs account for 30% of the final grade. These points are given at the beginning of the course and discounted every time lab goals are not met

Exams

Summative assessments will be held after an instructional block is completed. They will be focused on the subjects covered in the block. Theoretical and practical subjects will be evaluated. The Electrical Field Reference Handbook and a calculator will be necessary and allowed. The summative assessments will represent **20% of the final grade**.

The Final Exam is THE ULTIMATE SUMMATIVE ASSESSMENT. It is the culmination of this course, and will be strictly numeric and NEC based. It will be held in the sixteenth week. A calculator will be necessary and the Electrical Field Reference Handbook will be allowed as the only reference. ***The final exam represents 20% of the final grade and it must be at least a 50% in order to pass.*** Not taking the final exam, or having an F as grade, automatically disqualifies a student who will then not pass the course. Only in a very special case does a student that misses the Final receive an incomplete grade (IF or ID) in order to give him/her the opportunity to take the exam another day. Failing to do so will result in an automatic F or D.

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In summary

Participation	=	5%
Homework	=	25%
Labs	=	30%
Summative Assessments	=	20%
Final	=	20%

Grades

A “C” is required to successfully complete this course. That is the equivalent of the 70% of the total points (gathered between participation, homework, labs, and exams) with the strict condition of having at least the 50% of the final exam. Many students express test-taking anxiety with the consequent low performance, but notice that 60% of the grade is not based on testing but in personal effort, commitment, and the achievement of measurable goals. 100%, or a very high score, in HW, Labs, and Class Participation is possible, and in such cases, a mediocre performance in tests will be not a handicap to pass the class. The grading scale is as follows:

A = 90 to 100%
B = 80 to 89%
C = 70 to 79%
D = 50 to 69%
F = up to 49%

Keys for success

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- Start reading the class material immediately after or concurrently with the delivery of subjects. Take care of homework as soon as it is assigned. HW is related to the reading material. Answer the “Review Questions” and the “Using the NEC” questions at the end of each chapter of the textbook; that will make your reading more effective and your online homework easier to complete.
- Keep the HW questions next to you and answer the questions as soon as you found the key paragraphs that are related to the point. Summarize the main points. Good summaries will help you prepare for exams. Mark the text or keep notes on subjects that are not clear in order to ask for clarification the following class.

- Keep track of what HW you've turned in, the state of your labs, and the grades you are obtaining. These elements will give you a good idea of your progress and will show the areas that you need to work out.
- Remember: Homework is not a medium to test but to consolidate understanding. Students can and should ask about difficulties that they encounter in assignments, as well as show to the instructor drafts of written assignments prior to turning them in. Homework is the best tool to identify what is not clear and make it crystal clear. Homework is meant to learn and not to test.
- It is not a bad idea to organize some group sessions to review concepts and get ready for exams.
- IT IS VERY IMPORTANT to read and annotate the studying materials (textbook, handouts), highlighting issues that might not result clear to you, so that you can ask for clarification during the following class session.
- Keep the textbook, handouts, notes, and personal gear together.
- Formal education, such as this class, is a short term commitment with long term consequences. Some family matters – little league, Halloween, a fishing trip, etc... - may need to take the back seat for a while. It is up to the instructor to do the upmost to deliver good content, but up to the student to achieve success.

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