

# Syllabus ET 044 Journey Examination Preparation - 30 hours

## OBJECTIVES OF COURSE:

1. Know the qualifications to take the State of Michigan Journey Electrician Examination.
2. Understand the State Public Acts and administrative rules that regulate electrical wiring in Michigan.
3. Be able to apply Ohms Law, power law to any single-phase or three-phase circuit.
4. Solve for current, voltage and power for transformers, identify common electrical systems.
5. Determine the size of conductor for a circuit considering ambient temperature and more than three conductors in a raceway, cord or cable.
6. Calculate the voltage drop on a length of conductor.
7. Determine the minimum permitted service entrance conductor size and identify key *National Electrical Code* references that apply to electrical service entrances and feeders.
8. Explain the purpose and the basic requirement of electrical system grounding, bonding and equipment grounding and determine the minimum permitted conductor size for each.
9. Find Code requirements for the installation and use of the common electrical conduits, tubings and cables used in the electrical trade.
10. Determine the minimum size conduit, tubing, device box, pull box and conduit body for various applications.
11. Know the requirements for appliance circuits, and the placement of receptacle and lighting outlets in a dwelling as well as the required circuits.
12. Explain the requirements for GFCI and AFCI protection of circuits. Also, be able to identify a tamper-resistant, weather-resistant and an isolated ground receptacle.
13. Read and explain the use of the information on motor nameplate.
14. Size equipment and properly place equipment for a branch circuit that contains a single motor or air conditioner.
15. Begin to understand basic motor control diagrams.
16. Find Code information as it relates to special locations and occupancy such as, but not limited to, swimming pools, hazardous locations, health care facilities, transformers, temporary wiring and places of assembly.

## NECESSARY CLASS ITEMS:

You will need the following items for lectures, completion of sample problems and for the final exam.

- Calculator
- *2014 National Electrical Code*, National Fire Protection Association (NFPA).
- *Interpreting the National Electrical Code*, 9<sup>th</sup> Edition, Delmar Cengage Publishers.

## SUGGESTED CLASS ITEMS:

You will be referring to the following text book for lectures.

- *2009 Michigan Residential Code*, International Code Council (ICC).

**PASSING THE COURSE:**

To pass this course, apprentices **must** score at least a 75% on the final exam within six months of enrolling in the course. If the apprentice fails the examination, they will have one opportunity to re-study the course material and take a second examination. If a student is not successful on the second examination, the apprentice must re-enroll in the course and pay the course tuition fee again, to continue in MSU's apprenticeship program. When a passing grade is achieved, notify the course instructor, via an email. The email address is [althous2@msu.edu](mailto:althous2@msu.edu).

**TECHNICAL HELP:**

If you need technical assistance at any time during the course or to report a problem, you can visit the *Desire 2 Learn* help site. Technical assistance will provide help with:

- accessing the course
- viewing the online lectures or student practice problems
- hearing the online lectures
- viewing or printing the reading material for the course
- getting feedback on student practice problems
- determining your final exam score

For assistance, navigate to <https://d2l.msu.edu> in your favorite web browser and follow the link for "Help". A toll free phone number is provided that is staffed 24/7.

**COURSE STRUCTURE:**

This course consists of 10 lessons and a final exam. Each lesson in this course, consists of background reading material, a lecture and student practice problems. Some of the lessons have hands-on activities that are to be completed, then self-checked. It is anticipated that 30 hours total will be required to complete this course.

Background readings are from textbooks and *Tech Notes*. *Tech Notes* are papers dealing with specific subjects. Some *Tech Notes* will have much more detail than is required for the topic. You may use the same textbook and *Tech Notes* in later lessons and courses.

The student practice problems are designed for the student to apply the topics in the lesson. These practice problems are not graded, but are intended as a learning aid. Upon completing a problem set, you will be shown the answers and the method by which each question was answered. The practice problems serve as a self evaluation of the student's understanding of the course material and course objectives. When the student is ready, they may attempt the final exam, to determine if they can show proficiency in the subject matter.

Students may complete course requirements at their own personal pace, however, they will be limited to a **maximum of six months** to complete an individual class. After six months, the student will be dis-enrolled in the class. The student will need to re-enroll in the course and pay the course tuition fee again, if the student desires to continue in MSU's apprenticeship program.

**FINAL EXAM:**

When you are ready, you may attempt the final exam to determine your proficiency in the subject matter. There are actually two final exams you have the opportunity to complete, Final Exam A and Final Exam B. Final Exam "B" is **only** taken if the student does not achieve a passing score on the Final Exam "A". Please note the following:

- You will be given only **two hours** to complete each exam . It is suggested that students block out the appropriate amount of time to minimize interruptions and distractions. Once you open the exam, your two hours start.
- Have your National Electrical Code and calculator available, they may be necessary to complete the exam.
- Each exam includes 80 multiple-choice questions, randomly selected from a larger pool of questions. Thus, no two students will receive the same exam.
- Questions will be drawn from the course reading material, online lessons, homework, student projects, and student activities.
- All exam questions are presented at one time. Once you choose an answer on a question, you CAN go back to change your answer.
- Upon exam submission, you will receive feedback about your overall score in the exam but NOT detailed feedback about the correct answers to each of the exam questions.

**STUDY HINTS:**

To be successful at understanding the course material, the following method is suggested.

1. First, skim through the reading assignments to become familiar with the material.
2. Second, view the online lecture. Make sure you have your calculator, National Electrical Code book, and reading exercises handy. Have a notepad and work the examples as they are presented, to re-enforce the concepts. Take notes during the online lecture to help you recall topics at a later time.
3. Third, read the Tech Notes and any other reading assignments, to aid in comprehending the material.
4. Finally, answer the student practice questions and hands-on activities.

**QUESTIONS:**

Students and instructors may not be online at the same time. However, if you have any questions about the course material, there is a discussion board that will allow for interaction between the learners and course instructors. The interaction may not happen in real-time, but rather in a delayed format. Under most conditions, questions will be answered electronically within two business days of posting a question.

**COURSE OUTLINE:**

	<b>Topic</b>	<b>Reading Assignment</b>
	Introduction	-----
<b>I</b>	Exam Preparation	Tech Notes 105
<b>II</b>	Laws and Rules Regulating Electrical Wiring in Michigan	Tech Notes 100, 107 & 252.
<b>III</b>	Electrical Fundamentals	Text pages 1 - 15 & 271 - 275
<b>IV</b>	Branch Circuit and Feeder Conductors	Text pages 61 - 68, 76 - 77 & 216 - 219
<b>V</b>	Electrical Service Entrances and Feeders	Text pages 99 - 101 & 136 - 140
<b>VI</b>	System Grounding, Bonding & Equipment Grounding	Text pages 159 - 164 & 166 - 179
<b>VII</b>	General Wiring Materials and Enclosures for Conductors	Text pages 19 - 26, 51 - 61 & 68 - 76
<b>VIII</b>	General Wiring, Receptacle, Lighting and Appliance Circuits	Text pages 93 - 99, 101 - 103, & 106 - 110
<b>IX</b>	Branch Circuits for Electric Motors and Air Conditioners	Text pages 233 - 235, 239 - 246 & 248 - 250
<b>X</b>	Electrical Requirements for Special Occupancies and Equipment	Text pages 103 - 106, 163 - 168, 277 - 281, 305 - 317, & 333 - 341
<b>XI</b>	Final Exam	-----