HORRY GEORGETOWN TECHNICAL COLLEGE

INSTRUCTIONAL PACKAGE

EEM 118

AC/DC Circuits II

Effective Term
Spring 2020

INSTRUCTIONAL PACKAGE

Part I: Course Information

Effective Term: 202010

COURSE PREFIX: EEM-118 COURSE TITLE: AC/DC Circuits II

CONTACT HOURS: 6 CREDIT HOURS: 4

RATIONALE FOR THE:
This course serves as a foundation course in the mechatronics curriculum. Specifically, student will be introduced to AC electricity and electrical circuits, Electrical wiring and termination techniques and practices, and best practices for safely working with electricity in an industrial environment. This course serves as a continuation to EEM-117 AC/ DC circuits I and/or co-requisite to all Mechatronics courses.

COURSE DESCRIPTION:
This course is a continuation of the study of direct and alternating current theory to include circuit analysis using mathematics and verified with electrical measurements.

PREREQUISITES/CO-REQUISITES:
((ACCUPLACER Reading Comp 032 and ACCUPLACER Sentence Skills 036) or
(New ACCUPLACER Reading Comp 200 and New ACCUPLACER Sentence Skills 200) or
(COMPANION Reading 032 and COMPANION Sentence Skills 036) or
(SAT Critical Reading 300) or
(ACT Reading 12 and ACT English 10) or
(Multiple Measures English 1) or
(Credit level ENG 032 Minimum Grade of C* or Credit level ENG 100 Minimum Grade of C* or
Credit level ENG 155 Minimum Grade of C or Credit level ENG 155 Minimum Grade of TC or
Credit level ENG 101 Minimum Grade of C or Credit level ENG 101 Minimum Grade of TC)) and (Credit level MAT 032 Minimum Grade of C* or Credit level MAT 155 Minimum Grade of C or Credit level MAT 155 Minimum Grade of TC or
Credit level MAT 101 Minimum Grade of C or Credit level MAT 101 Minimum Grade of TC or
ACCUPLACER Elementary Algebra 040 or ACCUPLACER Arithmetic 024 or
New ACCUPLACER Arithmetic 200 or New ACCUPLACER Adv Algebra 200 or
SAT Mathematics 400 or New SAT Mathematics 350 or ACT Math 13 or Multiple Measures Math 1)

REQUIRED MATERIALS:

Please visit the Bookstore online site for most current textbook information. Use the direct link below to find textbooks.
BOOKSTORE.

Enter the semester, course prefix, number and section when prompted and you will be linked to the correct textbook.

ADDITIONAL REQUIREMENTS:
Headphones/earbuds for multimedia content, scientific calculator, (TI36x Pro or equivalent), USB flash drive. Colored pens or pencils, ¼ ruled graph paper

TECHNICAL REQUIREMENTS:
Access to Desire2Learn (D2L), HGTC's student portal for course materials.
WaveNet and D2L email access.

STUDENT IDENTIFICATION VERIFICATION
Students enrolled in online courses will be required to participate in a minimum of one (1) proctored assignment and/or one (1) virtual event to support student identification verification. Please refer to your Instructor Information Sheet for information regarding this requirement.

CLASSROOM ETIQUETTE:
As a matter of courtesy to other students and your professor, please turn off cell phones and other communication/entertainment devices before class begins. If you are monitoring for an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

NETIQUETTE: is the term commonly used to refer to conventions adopted by Internet users on the web, mailing lists, public forums, and in live chat focused on online communications etiquette. For more information regarding Netiquette expectations for distance learning courses, please visit Online Netiquette.

Part II: Student Learning Outcomes

COURSE LEARNING OUTCOMES and ASSESSMENTS*:

1. Students shall exhibit critical reasoning when confronted with technical day-to-day problems and challenges.
2. Students shall know and demonstrate safe working habits and procedures IAW current OSHA standards.
3. Students shall analyze Ac circuits to include inductive, capacitive, resistive and combinational circuits.
4. Students will be able to calculate the power factor of an AC circuit.
5. Students will wire various industrial circuits.
6. Students will properly terminate communication and power circuits.

7. Students will be able to operate electrical and electronics equipment to test and diagnose circuit operation.

Instructional Topics:

Industrial Soldering

1. Define soldering and provide industrial applications.
2. Describe the three types of solder and give an application for each.
3. Describe the three solder connection types.
4. Describe and identify tools used for soldering.
5. List six safety rules for soldering.
6. Describe the steps to prepare for soldering.
7. Describe the basic steps to solder a connection.
8. Describe how to inspect a soldering bond.
9. Describe five types of solder wick.
10. Describe how to desolder a connection using a solder wick.
11. Describe how to desolder a connection using a solder sucker.
12. Describe how to solder DB connectors to cable wire.
13. Describe how to solder wire to the terminals of an electrical component.

Ethernet and Analog Wiring

1. HMI Panel installation
2. Describe how and to wire and test an HMI Panel Ground and Power Circuit.
3. Describe how to Construct and Test a Cat 5 Ethernet Cable
4. Describe how to interface and test an HMI panel and PLC Via Ethernet II.
5. Describe how to install and test an Ethernet Switch.
6. Describe how to Install and Wire Power to a 2-Wire DIN Rail Mounted Transmitter.
7. Describe How to Interface a 2-Wire, DIN Rail Mounted Transmitter to an Analog Input and Test its Operation.
8. Describe How to Interface a Thermocouple to a Transmitter

Sensors

1. List five advantages of electronic sensors and two disadvantages.
2. List five type of electronic sensors.
3. Describe the function of the two parts of an electronic sensor.
4. Describe the operation of two types of transmitters used in electronic sensors.
5. Describe the operation of an inductive proximity sensor and give an industrial application.
6. Describe five characteristics that affect inductive proximity sensor operation.
7. Describe the operation of a capacitive proximity sensor and give an industrial application.
8. Describe the five characteristics that affect capacitive proximity sensor operation.
9. Describe the operation f a magnetic reed switch and give industrial applications.
10. Describe six characteristics that affect the magnetic reed switch operation.
11. Describe the operation of a hall effect sensor and give industrial applications.

12. Describe three characteristics that affect hall effect sensor operation.
13. Describe the operation of a photoelectric sensor and give industrial applications.
14. Describe five characteristics that affect photoelectric sensor operation.

**Students – please refer to the Instructor's Course Information sheet for specific information on assessments and due dates.*

General Education Outcomes

This course fulfills the following General Education Outcomes through the Upon completion of this course, students will be able to:

☒Communicate effectively;
☒Think critically;
☐Self and professional development.

Effective Professional and Interpersonal Communication (EPIC)

This course fulfills HGTC's Quality Enhancement Plan for Effective Professional and Interpersonal Communication. Upon completion of this course, students will be able to:
(Check all that apply.)
☒Utilize appropriate communication formats when conveying professional and interpersonal thoughts and ideas.
☒Apply appropriate language when speaking and writing for their chosen field of study or Industry.
☐Demonstrate appropriate communication techniques when engaging audiences.

Part III: Grading and Assessment

EVALUATION OF REQUIRED COURSE MEASURES/ARTIFACTS*

Students' performance will be assessed and the weight associated with the various measures/artifacts are listed below.

EVALUATION*

Tests	20%
Labs	30%
Assignments	20%
Class Participation	5%
Shop Practices	5%
Final Exam	20%
	100%

Students, for the specific number and type of evaluations, please refer to the Instructor's Course Information Sheet.

Learning Topics

1. ***AC circuits and reactive components.***
2. ***Industrial Soldering Techniques***
3. ***Ethernet and Analog wiring techniques***
4. ***Electrical control wiring techniques***
5. ***Sensors and their applications***
6. ***Electrical control wiring techniques***

GRADING SYSTEM:

HGTC has a standardized, recommended grading scale for academic courses. The grading scale requires that grades within the indicated range be defined as follows:

A: 90-100	B: 80-89	C: 70-79	D: 60-69	F: Below 60

The following grades are used:

A - EXCELLENT: used in GPA calculations; carries a value of 4 quality points and earns credit hours.

B - ABOVE AVERAGE: used in GPA calculations; carries a value of 3 quality points and earns credit hours.

C - AVERAGE: used in GPA calculations; carries a value of 2 quality points and earns credit hours.

D - BELOW AVERAGE: used in GPA calculations; carries a value of 1 quality point and earns credit hours.

F - FAILURE: used in GPA calculations; carries a value of 0 quality points and earns 0 credit hours. (Hours attempted are used in GPA calculations.)

I - INCOMPLETE: does not affect GPA calculations; defaults to "F" automatically after one term if the incomplete work has not been completed and generates 0 quality points and 0 credit hours. (See special note below.)

WF - WITHDRAWN FAILURE: used in GPA calculations; carries a value of 0 quality points and earns 0 credit hours. (Hours attempted are used in GPA calculations.)

W - WITHDRAW: not used in GPA calculations; carries a value of 0 quality points and earns 0 credit hours. May be utilized when extenuating circumstances warrant.

Note: Regarding a grade of "I" (Incomplete): A grade of Incomplete ("I") is assigned when the student does not complete work or take the final exam due to illness or for other reasons over which the student has no control. This grade is given only with the approval of the professor involved. An incomplete must be completed by the end of the following term. Otherwise, the grade becomes an automatic failure ("F").

Grades earned in courses impact academic progression and financial aid status. Before withdrawing from a course, be sure to talk with your instructor and financial aid counselor

about the implications of that course of action. Ds, Fs, Ws, WFs and Is also negatively impact academic progression and financial aid status.

The Add/Drop Period is the first 5 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format courses. Please refer to the academic calendar for deadlines for add/drop (ACADEMIC CALENDAR). You must attend at least one meeting of all of your classes during that period. If you do not, you will be dropped from the course(s) and your Financial Aid will be reduced accordingly.

Part IV: Attendance

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be present for a minimum of eighty percent (80%) of his or her classes in order to be eligible to receive credit for any course. However, due to the varied nature of courses taught at the College, a more rigid attendance policy may be required by individual instructors. At a minimum, a student may be withdrawn from a course(s) after he or she has been absent in excess of ten percent (10%) of the total contact hours for a course. **Instructors define absentee limits for their class at the beginning of each term; please refer to the Instructor Course Information Sheet.**

For online and hybrid courses, check your Instructor's Course Information Sheet for any required on-site meeting times. Please note, instructors may require tests to be taken at approved testing sites, if you use a testing center other than those provided by HGTC, the center may charge a fee for its services.

Part V: Student Resources

The Student Success and Tutoring Center (SSTC)

The SSTC offers to all students the following **free** resources:

1. **Academic coaches** for most subject areas, **Writing Center Support**, and **college success skills.**
2. **On-line student success and academic support resources.**

Visit the SSTC website: Student Success & Tutoring Center and visit the student services tab in your WaveNet account to schedule appointments using TutorTrac. For more information, call: SSTC Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455 or go to the Online Resource Center to access on-demand resources any time.

Student Information Center: WaveNet Central (WNC)

WNC offers to all students the following **free** resources:

1. **Getting around HGTC**: General information and guidance for enrollment!
2. Use the **Online Resource Center (ORC)** for COMPASS support, technology education, and online tools.

3. **Drop-in technology support or scheduled training** in the Center or in class.
4. **In-person workshops, online tutorials and more services** are available.

Visit the WNC website: Wavenet Central. Live Chat and Center locations are posted on the website. Or please call one of the following locations: WNC Conway, 349-5182; WNC Grand Strand, 477-2076; and WNC Georgetown, 520-1473.

Student Testing: (If course is offered in multiple format include this section, delete if only F2F sections are offered.)
Testing in an **online/hybrid** course may be accomplished in a variety of ways:

- Test administered within D2L
- Test administered in writing on paper
- Test administered through Publisher Platforms

Further more tests may have time limits and/or require a proctor.

Proctoring can be accomplished either face-to-face at an approved site or online through RPNow, our online proctoring service. To find out more about proctoring services, please visit the Online Testing section of the HGTC's Testing Center webpage.

The **Instructor Information Sheet** will have more details on test requirements for your course.

Disability Services:

HGTC is committed to providing an accessible environment for students with disabilities. Inquiries may be directed to Beth Havens, Director of Student Development on the Conway Campus Jaime Davis, Counselor/Advisor on the Georgetown Campus or Kristin Griffin, Counselor on the Grand Strand Campus. These individuals will review documentation of the student's disability and, in a confidential setting with the student, develop an educational accommodation plan.

Note: It is the student's responsibility to self-identify as needing accommodations and to provide acceptable documentation. After a student has self-identified and submitted documentation of a disability, accommodations may be determined, accepted, and provided.

Statement of Equal Opportunity/Non-Discrimination Statement
Horry-Georgetown Technical College prohibits discrimination and harassment, including sexual harassment and abuse, on the basis of race, color, sex, national or ethnic origin, age, religion, disability, marital or family status, veteran status, political ideas, sexual orientation, gender identity, or pregnancy, childbirth, or related medical conditions, including, but not limited to, lactation in educational programs and/or activities.

Inquiries regarding the non-discrimination policies: Students and prospective student inquiries concerning Section 504, Title II, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs, Dr. Melissa Batten, VP Student Affairs, Title IX Coordinator, Building 1100, Room 107A, Conway Campus, PO Box 261966,

Conway, SC 29528-6066, 843-349-5228, Melissa.Batten@hgtc.edu. Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Vice President for Human Resources, Jacquelyne Snyder, VP Human Resources, Section 504, Title II, and Title IX Coordinator, Building 200, Room 212A, Conway Campus, PO Box 261966, Conway, SC 29528-6066, 843-349-5212, Jacquelyne.Snyder@hgtc.edu.

Title IX Requirements

All students (as well as other persons) at Horry-Georgetown Technical College are protected by Title IX—regardless of their sex, sexual orientation, gender identity, part- or full-time status, disability, race, or national origin—in all aspects of educational programs and activities. Any student, or other member of the college community, who believes that he/she is or has been a victim of sexual harassment or sexual violence may file a report with the college's Chief Student Services Officer, campus law enforcement, or with the college's Title IX Coordinator, or designee.

> *Faculty and Staff are required to report incidents to the Title IX Coordinators when involving students. The only HGTC employees exempt from mandatory reporting are licensed mental health professionals (only as part of their job description such as counseling services).

Inquiries regarding the non-discrimination policies:	
Student and prospective student inquiries concerning Section 504, Title II, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs.	Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Vice President for Human Resources.
Dr. Melissa Batten, VP Student Affairs *Title IX Coordinator* Building 1100, Room 107A, Conway Campus PO Box 261966, Conway, SC 29528-6066 843-349-5228 Melissa.Batten@hgtc.edu	**Jacquelyne Snyder, VP Human Resources** *Section 504, Title II, and Title IX Coordinator* Building 200, Room 212A, Conway Campus PO Box 261966, Conway, SC 29528-6066 843-349-5212 Jacquelyne.Snyder@hgtc.edu