Instructor:　　　　　　　　　**Prof. S. Ciccarelli, Office:** GOL (70) -1353
　　　　　　　　　　　　　　　　Office Hours: Monday　　　9:00 – 9:50AM
　　　　　　　　　　　　　　　　　　　　　　Wednesday　9:00 – 9:50AM, 2:00 – 2:50PM, 3:00 – 3:50PM
　　　　　　　　　　　　　　　　　　　　　　Friday　　　2:00 – 2:50PM
　　　　　　　　　　　　　　　　　　　　　　And by appointment (see me directly/email me for an appt)

Please see our myCourses site and my door for the most up to date office hours and of course feel free to stop in whenever my door is open. When possible, email me ahead of time if you will be stopping by during these hours as I occasionally get called to the lab or a meeting.

Phone: (585) 475-4736 or x5 4736 from on campus
E-mail: smceee@rit.edu (**preferred method of contact** instead of the telephone)

Course Name:　　　　　**AC Circuits Lecture**
Credit Hours:　　　　　3
Prerequisites:　　　　　**EEET-111** DC Circuits Lecture with a grade of C- or higher
　　　　　　　　　　　　　　EEET-112 DC Circuits Lab with a grade of C- or higher

Co-Requisites:　　　　　**MATH-171** Calculus A or higher
　　　　　　　　　　　　　　EEET-122 AC Circuits Lab

You MUST successfully complete this lecture course AND AC Circuits Lab in order to advance to Electronics I Lecture and Lab and Electrical Machines and Transformers Lecture and Lab

Course Nos.:　　　　　**EEET-121-01:** Mon, Wed, Fri 12:00PM – 12:50PM, GLE (09) – 2149
　　　　　　　　　　　　　EEET-121-02: Mon, Wed, Fri 10:00AM – 10:50AM, ENG (17) – 1545
　　　　　　　　　　　　　EEET-121-03: Mon, Wed, Fri 1:00PM – 1:50PM, GLE (09) – 2149

Course Description:

This course in AC circuit analysis techniques develops the skills to analyze and design practical AC circuits used in electrical systems. Topics include network theorems, reactance and impedance, AC power and power factor, resonance, maximum power transfer, frequency response, and bandwidth.

Rational and Goals:

Students, upon completion of this course, will have the analytical tools to understand AC circuits. They should be able to design, analyze and troubleshoot AC circuits of reasonable complexity with sufficient proficiency to undertake further study in machines and transformers, electronics and advanced circuit theory.

Intended Learning Outcomes:

A student who successfully fulfills the course requirements will have demonstrated:

(1) Proficiency regarding the complex number system and the performance of operations with complex numbers as they apply to AC circuit analysis.

(2) Proficiency in the application of AC principles/concepts/ techniques to the analysis of resistor-inductor-capacitor circuits.

(3) The ability to design basic series and parallel resonant circuits.

(4) The ability to apply the ideal iron-core transformer model to situations requiring an increase or decrease in voltage levels or impedance matching.

Required Materials:

- *Introductory Circuit Analysis,* by R.L. Boylestad, Prentice Hall Publishing, 13th Edition (ISBN # 978-0-13-392360-5)

   - *This is the same textbook required for DC Lecture and Lab*

   - *The **international/global edition is NOT recommended** as many of the homework problems and sections do NOT match the US edition detailed above*

- **An advanced graphing/scientific calculator that handles complex numbers, equations and calculations**. The TI-89 calculator is used in examples throughout the textbook while the HP 50G, HP Prime and TI-Nspire CX CAS are also excellent examples of advanced graphing calculators that meet this requirement and will serve you well in AC Lecture and Lab as well as in multiple follow-on courses. I am personally familiar with the HP calculators and your learning assistants are familiar with the TI calculators.

   * NO LOANER CALCULATORS WILL BE AVAILABLE, make sure you have a fully functional calculator with fresh batteries/charge for each class and especially for quizzes and exams. *

Active Learning:

Studies have shown that student recall and comprehension increase significantly when active learning techniques are employed. In order to meet the course learning objectives and better facilitate the learning process, active learning techniques will be used throughout the semester. These techniques include informal group activities, structured team activities, and significant problem based learning.

As a side benefit of these techniques, we should be able to have some fun with the course material during the semester.

Lecture topics will include subjects from:

Chapter 13 – Sinusoidal Alternating Waveforms

Chapter 14 – The Basic Elements and Phasors

Chapter 15 – Series AC Circuits

Chapter 16 – Parallel AC Circuits

Chapter 17 - Series/Parallel AC Networks

Chapter 18 - Methods of Analysis and Selected Topics (AC)

Chapter 19 - Network Theorems (AC)

Chapter 20 – Power (AC)

Chapter 21 – Resonance

Chapter 22 – Decibels, Filters and Bode Plots

Chapter 23 – Transformers

Chapter 24 – Polyphase Systems

* Tentative Course Schedule/Outline:

Week/Date	Lecture Subject	Text Sections (READ BEFORE CLASS)	Homework
1 (01/14)	Sinusoidal Alternating Waveforms: Characteristics, period and phase relations, general format for V&I	Ch 13: 1 through 6	HW #1 Assigned
	Sinusoidal Alternating Waveforms: Average and effective (rms) values	Ch 13 : 7 through 9	
2 (01/21) **2 sessions**	Basic Elements and Phasors: Response of R-L-C elements to sinusoids, frequency response, power factor, complex numbers	Ch 14: 1 through 5	HW #1 Due HW #2 Assigned
3 (01/28)	Basic Elements and Phasors: Complex numbers – forms, conversions, mathematical operations, calculator operations	Ch 14: 6 through 12	HW #2 Due HW #3 Assigned
4 (02/04)	Series AC Circuits: R,L,C elements, impedance diagrams, series configuration and analysis **Exam #1 – Chapters 13.1 through 14.12**	Ch 15: 1 through 9	HW #3 Due HW #4 Assigned
5 (02/11)	Series AC Circuits: Summary, phase measurements, applications and computer analysis	Ch 15: 10 through 12	HW #4 Due HW #5 Assigned
	Parallel AC Circuits: Impedance, admittance, parallel configuration & analysis	Ch 16: 1 through 10	
6 (02/18)	Series-Parallel AC Networks: Examples, ladder networks and grounding *Review/catch-up*	Ch 17: 1 through 4	HW #5 Due HW #6 Assigned
7 (02/25)	Methods of Analysis: Dependent source intro, source conversions, mesh and nodal analysis	Ch 18: 1 through 5	HW #6 Due HW #7 Assigned
8 (03/04)	Network Theorems: Superposition, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer **Exam #2 – Chapters 15.1 through 18.5**	Ch 19: 1 through 5	HW #7 Due HW #8 Assigned
03/11	**SPRING BREAK**	**NO CLASSES**	
9 (03/18)	Power (AC): Resistive, apparent, reactive power, power factor and triangle, power-factor correction	Ch 20: 1 through 9	HW #8 Due HW #9 Assigned
10 (03/25)	Resonance: Series and parallel resonance, quality factor, applications & computer analysis	Ch 21: 1 through 12	HW #9 Due HW #10 Assigned
11 (04/01)	Resonance: Applications & computer analysis	Ch 21: 13 through 16	HW # 10 Due HW # 11 Assigned
	Filters: Decibels, filter intro, RC low pass filter	Ch 22: 1 through 5	

Week/Date	Lecture Subject	Text Sections (READ BEFORE CLASS)	Homework
12 (04/08)	Filters: RC high pass filter, band-pass and band-reject filters *Review/catch-up* **Exam #3 – Chapters 19.1 through 22.5**	Ch 22: 6 through 8	HW # 11 Due HW # 12 assigned
13 (04/15)	Transformers: Introduction, ideal iron-core, impedance, equivalent circuit, frequency considerations	Ch 23: 1 through 7	HW #12 Due HW # 13 Assigned
14 (04/22)	Polyphase systems: Introduction, three phase generators and loads	CH 24: 1 through 8	HW # 13 Due HW # 14 Assigned
15 (04/29) **1 session**	Final Exam review Session		HW # 14 Due
Final Exams (05/01 – 05/08)	**FINAL EXAM** TBA – See the SIS (Date subject to change during the semester)	Comprehensive	

* Our daily class outlines are more up to date and supersede this preliminary schedule.

Last day to add/drop: January 22nd

Last day to withdraw with a grade of "W": April 5th

Evaluation Criteria

Several methods of evaluating course objectives will be employed including traditional testing and homework as well as quizzes.

Homework:

- Homework will be assigned at the beginning of each week and due at the beginning of class (on Mondays) the following week. It is strongly recommended that you complete all of the homework problems. Experience indicates that those students not completing homework problems are more likely to do poorly in this course. Homework solutions will be posted online.

- The work shown is to be your own (you are expected to work together in your teams on the homework but *may not directly copy each other*) except for the team homework problem(s).

- Each homework assignment will be graded out of 20 points. Up to 10 points will be awarded based on your overall effort to seriously attempt each problem assigned **and to follow the proper format (see below)**. Five points will be decided upon by grading ONE SELECTED PROBLEM on each assignment. The remaining five points will be determined by grading the assigned TEAM HOMEWORK problem(s).

- Your individual homework solutions must be turned-in at *the beginning of class each Monday*. Your solution must be neat, organized, properly formatted and correct for full credit:

- o **Use ONLY quadrille lined or green engineering paper**, no frayed or rough edges. You can purchase this paper in the bookstore or your favorite office supply store.

- o **Place the following header information at the top of the first page** of your assignment:
    - Course number (including section) and semester
    - Your name, program code, due-date and homework number
    - Your instructor's Name

- o **Place the following footer information at the bottom of all of the pages** of your assignment:
    - Your name
    - Page number (current_page OF total_pages)

- o **Number each problem** including the chapter it comes from.

- o **Restate each problem and include any supporting diagrams or schematics** that the problem statement refers to.

- o **Your solution should be presented in a format that proceeds from left to right and top to bottom**. If the organization of the solution is unclear, a grade of zero will be assigned.

- o **Box-in the final answer for each problem and make sure you use the appropriate units and engineering notation**.

- o **Work that is illegible will receive a grade of zero.**

- o **Use a pencil and an eraser or a pen and whiteout**, multiple cross-outs are unacceptable.

- o **Make sure that all of the pages of your homework assignment are attached securely by using a staple in the upper-left-hand corner** (do not use a paperclip or fold your page corners).

- o *LATE homework assignments WILL NOT BE ACCEPTED and a grade of zero will be assigned. If you are going to miss lecture, send your homework assignment to class on-time with a team member.*

- For the **TEAM HOMEWORK PROBLEM(S)**:
    - o The team homework problem must also be submitted at the beginning of class on Mondays. **Follow the same format listed above except clearly place your TEAM NAME and the individual members' names who worked on the assignment on the top of the first page.**
    - o You will submit one team homework assignment per team each week. **Any team member that does not work on this assignment will receive a zero for this portion of the weekly homework** grade.

Quizzes:

- Quizzes will typically be given on Fridays during the first 10 to 20 minutes of class. The quiz will be similar to assigned homework problems or lecture examples from the previous week or so. Quizzes will be closed book, closed notes. The lowest quiz grade will be dropped. There will be no makeup quizzes.

- There may be multiple unannounced/alternate quizzes based on recently covered or current course topics. These quizzes may be in the form of individual or team work or as in-class or out of class assignments.

- A few of the quizzes will be TEAM QUIZZES and as such, each team member is expected to contribute. Team members not contributing to these quizzes will receive a zero quiz grade for the assignment. Team members arriving to class late that day will have to take the quiz on their own.

Tests (1 through 3):

- Three tests will be given during the Semester (see the attached schedule). You will be given the formula sheet from the textbook for use during each exam; otherwise the exams will be closed book, closed notes.

- Make-up tests will be considered only if the student informs the instructor of the absence prior to the test date and missing that exam is due to a verified medical necessity. If prior notification is not possible, notification and verification must take-place immediately following the exam. In these cases a make-up test can be scheduled at the instructor's discretion but will not receive a grade greater than 70%.

Final Exam:

- You will be given the formula sheet from the textbook for use during the final exam, otherwise the final is a closed book, closed-notes test. There will not be a make-up for the final.

- If your overall unadjusted course grade is 92% (an **A** grade) or higher going into the final exam period, the final exam is optional for you.

Attendance and Course Participation:

- Students are responsible for all material covered in lecture. This includes unforeseen changes to the quiz/exam schedules announced in class and/or online.

- Students are fully expected to attend class and participate in the team-based activities by working with their peers and the instructor as outlined each day.

- Course participation grades are based on attendance, interaction in class, homework and quiz completion rates as well as collaboration and output within student teams.

Grading Policy:

Weekly homework	15%
Weekly quizzes	20%
Exams 1 - 3	30% (10% each)
Final exam	25%
Course participation	10%

The final course-grade is based on the following letter grade breakdown:

92 - 100	A
90 - 92	A -
88 - 90	B +
82 – 88	B
80 – 82	B -
78 – 80	C +
72 – 78	C
70 - 72	C -
60 - 70	D
Below 60	F

Special Needs:

RIT is committed to providing reasonable accommodations to students with disabilities. If you would like to request accommodations such as special seating or testing modifications due to a disability, please contact the Disability Services Office. It is located in the Student Alumni Union, Room1150; the Web site is www.rit.edu/dso. After you receive accommodation approval, it is imperative that you see me during office hours so that we can work out whatever arrangement is necessary.

Incomplete ("I") and Withdraw ("W") grades:

Incompletes will only be given after week 10 of the semester for appropriate hardship situations (unexpected business trip, illness/death in the family, etc.). An incomplete grade WILL NOT be assigned to students failing and/or falling behind in their work.

Course withdrawal may be made online through the 12th week of the semester. In unusual circumstances beyond the control of the student, a "W" grade may be assigned after the 12th week with the approval of the instructor, department chair, & dean of the college. No credit hours are earned and your GPA is not affected by a "W" grade, however a 'W' will show on your transcript. "Unusual circumstances" do not include poor or lacking performance and the instructor will not sign late 'W' requests unless documented circumstances warrant such action.

Other Course Policies:

- **Check the course My Courses site regularly** for additional course content, announcements or messages daily. If we need to contact you personally or the entire class, we will use the myCourses system so make sure that you check the conference daily and that your information is current in the RIT directory.

- As instructor, I reserve the right to modify anything on this syllabus including reading assignments, lecture topics, quiz/test dates, homework assignments, etc. I will do so with plenty of notice via in-class announcements and/or using myCourses.

- E-mail will almost always be responded to within 24 hours during the workweek, please do not expect a 20-minute turnaround although this may often be the case.

- Graded assignments will generally be returned to you within 7-10 days.

- Requests for the instructor to review a graded assignment must be received within 48 hours of the return of the assignment and will be honored at the instructor's discretion. Reviewing a graded assignment will result in a complete re-grade and may/may not have the desired outcome.

- Although you are *EXPECTED* and *ENCOURAGED* to create and utilize a study-group, individual and original efforts are expected for all exams, quizzes and homework assignments except when otherwise stated; for example team homework assignments are a team activity. Efforts of

multiple students may result in equally divided scores for submitted work or appropriate disciplinary action.

- **Any student who is not actively participating in the lecture may be asked to leave***. Please do not try to catch up on your sleep in class. Your team members and I are counting on you to be fully conscience during class time.*

- **Cellular/PCS telephones, pagers, smartphones, PDAs, etc. must be turned-off or put in silent mode during class and out of sight**. If your device disrupts the lecture, you may be asked to leave immediately. Upon a second offense, you will need to explain your actions to the ECTET Department Head before being allowed to return. *If you require an exception to this policy, please see me before creating a disturbance.*

  The devices mentioned above and all other electronic devices except approved calculators must be placed out of your reach and sight during quizzes and exams.

- **You may not use a PDA, laptop (or other) computer, IPOD, smartphone or similar device in-class without instructor approval or during quizzes or exams.** *I know you may enjoy listening to music while working but have to insist that you leave the distractions out of the classroom.*

- **If you wish to take daily notes on your laptop or tablet computer, you need to email me directly and request permission during the first week of class.** I will randomly request a copy of your electronic notes and if you cannot provide them or are found to be using your device for non-course related activities during class, this privilege will be revoked. *I realize this may seem harsh but you and those around you will learn much better without distractions.*

- Bring the required textbook to all classes (one per team).

<u>Academic Honesty</u>

Rochester Institute of Technology <u>does not condone any form of academic dishonesty</u>.

Any act of improperly representing another person's work as one's own is construed as an act of academic dishonesty.

These acts include, but are not limited to:

- **Plagiarism in any form (including the use of all or parts of computer programs created by others without clearly indicating that you are not the author)**

- **The use of information and materials not authorized by the instructor during an examination**

If a faculty member judges a student to be guilty of some form of academic dishonesty, the student may be given a failing grade for that piece of work, or for the entire course, depending upon the severity of the misconduct.

If the student believes that the action taken by the instructor is incorrect, or that the penalty is too severe, the student may appeal to the Academic Conduct Committee of the college in which the course is offered.

<u>Policy C 6.0: Policy Prohibiting Discrimination and Harassment</u>

RIT is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our governance website. RIT's policies require faculty to share information about incidents of gender based discrimination and harassment with RIT's Title IX coordinator or deputy coordinators, regardless whether the incidents are stated to them in person or shared by students as part of their coursework.

If you have a concern related to gender-based discrimination and/or harassment and prefer to have a confidential discussion, assistance is available from one of RIT's confidential resources on campus (listed below).

1.   The Center for Women & Gender: Campus Center Room 1760; 585-475-7464; CARES (available 24 hours/7 days a week) Call or text 585-295-3533.

2.   RIT Student Health Center – August Health Center/1st floor; 585-475-2255.

3.   RIT Counseling Center - August Health Center /2nd floor - 2100; 585-475-2261.

4.   The Ombuds Office – Student Auxiliary Union/Room 1114; 585-475-7200 or 585-475-2876.

5.   The Center for Religious Life – Schmitt Interfaith Center/Rm1400; 585-475-2137.

6. NTID Counseling & Academic Advising Services – 2nd Floor Lynden B. Johnson; 585-475-6468 (v), 585-286-4070 (vp).

Remember **RIT R**esilience

Success depends heavily on your personal health and well-being. **<u>Recognize</u>** that stress is an expected part of the college experience, and it often can be compounded by unexpected setbacks or life changes outside the classroom. Your instructors strongly encourage you to **<u>reframe</u>** challenges as opportunities for growth. **<u>Reflect</u>** on your role in taking care of yourself throughout the term, before the demands of exams and projects reach their peak. Please feel free to **<u>reach out</u>** to your professors about any difficulty you may be having that may impact your performance as soon as it occurs and before it becomes unmanageable. In addition to your academic advisor, you are strongly encouraged to contact a number of other support services on campus that stand ready to assist you.