

PHYS 102 The Physics of Sound and Music

The Combination PHYS 102/122 has no prerequisites.

You can use this combination either as a lab science or science perspective. Pick One.

Instructor: Michael Ruiz, Ph.D.; Text: Online. **You need Internet access with Google Chrome.**

The textbook is free and at our website (a \$250+ Savings). ruiz@unca.edu

August 2019




| Monday | Tuesday | Wednesday | Thursday | Friday |
|--------|----------------------------|-----------|-------------------------------|-------------------------------|
| | | | 1 | 2 |
| 5 | 6 | 7 | 8 | 9 |
| 12 | 13 | 14 | 15 | 16 |
| 19 | 20 A. What is Sound? | 21 | 22 B. Vibrations | 23 Last Day to Drop/Add |
| 26 | 27 C. Waves | 28 | 29 D. Wave Applications | 30 |

Website: www.uncasound.com or <http://www.opus.unca.edu/sound/>

Our online course website was a top science/technology news story on CNN in 2002.



September 2019

| Monday | Tuesday | Wednesday | Thursday | Friday |
|--|-------------------------------------|-----------|-------------------------------|--------|
| 2  | 3 E. Modulation | 4 | 5 F1. Lissajous Figures | 6 |
| 9 | 10 F2. Just Diatonic Scale | 11 | 12 G. Strings | 13 |
| 16 | 17 H. Pipes | 18 | 19 I. Fourier Analysis | 20 |
| 23 E1 (A-G) Taken on Your Lab Day | 24 J. The Moogerfooger | 25 | 26 K. The Laws of E&M | 27 |
| 30 | | | | |





Class Responsibilities and Resources

1. **Online Text:** www.uncasound.com Assignments are done online. Note the due dates.
2. **Notes:** You get access to “Power Notes,” guided sheets you can fill in class.
3. **Homework:** Due 11:59 pm Friday night. You are on your own if you do it after 12 pm Thurs.
4. **Projects:** There are two projects you work on over a period of weeks. Know these due dates.
5. **Office Hours:** I am in RRO 114 or 124D: T & R 11:15-11:45, W 10:45-11:45, 1:00-2:00.
6. **The Forum:** Help your peers out with assignments on our 24/7 online discussion forum.
7. **Attendance (50):** You can miss 2 classes, but there is a bonus (10) for attending all classes. **You may see me to make up the bonus classes.**
8. **Official UNCA Travel:** See me 2 weeks prior to make arrangements for a missed class.
9. **Religious Observances:** See me 2 weeks prior to make arrangements for the Observance.
10. **Extra Credit:** Do questions in the text up until December 2. See Bonus on page October.

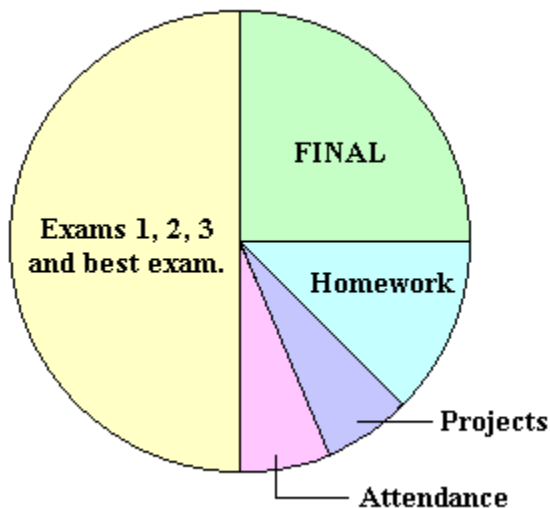


October 2019

| Monday | Tuesday | Wednesday | Thursday | Friday |
|---|--|---|-------------------------------|--|
| | 1 L. Sound Systems | 2 | 3 M. Analog Electronics I | 4 |
| 7 | 8 N1. Analog Electronics II | 9 | 10 N2. Digital Electronics | 11 First Web Project Due |
| 14 Fall | 15 Break  | 16 | 17 O. Signal Processing | 18 Last Day to Withdraw is 10/21/2019 |
| 21 E2 (H-N) Taken on Your Lab Day | 22 P. Moog Synthesizer I | 23 | 24 Q. Moog Synthesizer II | 25 |
| 28 | 29 R. The Ear | 30  | 31 S. Perception | |

Last day to withdraw from a full semester class is Monday, October 21, 2019.

Grading (This course typically has a class grade point average in the 2.6 to 2.8 range).




- 100 Exam 1 aka E1
- 100 Exam 2 aka E2
- 100 Exam 3 aka E3
- 200 Final aka FN
- 100 Best Exam Percentage
- 100 Web Homework (Due Weekly)
- 50 Two Web Projects (25 points each)
- 50 Minus 5 per miss after 2 free misses
- 800 Total** (No ± Grades, See Below)

- A (740-800) - apply knowledge in new areas
- B (660-739) - apply knowledge in familiar areas
- C (580-659) - apply knowledge in easy areas
- D (500-579) - misconceptions in principles
- F (0-499) - serious gaps in understanding

Bonus and Borderline: If you attend all classes you get a 10-point bonus. If your grade is borderline, I will consider helping you if you come to class, pay attention, put in effort with homework and extra credit. For very close cases I will also look for a strong Final.

November 2019

| Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---------------------------------|--------------------------------------|--|---|
| | | | | 1 |
| 4 | 5 T. Audiology | 6 | 7 U. Spectrograms | 8 |
| 11  | 12 V. Musical Temperament | 13 | 14 W. Woodwind Instruments | 15 |
| 18 E3 (O-U) Taken on Your Lab Day | 19 X. Brass Instruments | 20 | 21 Y. String Instruments | 22 |
| 25 | 26 UR Symposium | 27 <i>Thanksgiving Begins</i> | 28  | 29  |

How to Succeed in Sound

1. Time. Reserve at least 2 hours (reading, study, web apps, multimedia, assignments, etc.) for every hour of class. This time is at least 6 hours per week in addition to class time. If you are a full-time student and have a job, you should NOT work more than 15-20 hours per week.

2. Instructor. Drop by weekly during office hours. If you have any problems, come talk to me.

3. Peers. Ask your classmates for help, e.g., at the peer *Forum* on our website and offer help to others. You master the material when you are challenged to explain it to someone else.

Come to every class and take notes. Do not fall behind! Science classes build on previous classes. Use our "Exam Practice", where you see actual exam questions. If you spend lots of time with "Exam Practice" you will virtually see all the possible questions that can be on your exams. But the best advice is to first carefully study the solutions to old exams.

UNCA is committed to making courses accessible to persons with documented special learning needs. To apply, register with the Office of Academic Accessibility and then see me ASAP.

Make-Up Classes. See me within a week if you would like to make up a missed class.

The Friday Rule: If you wait until the due date (Friday), you are completely on your own, no matter what problems arise, including computer difficulties. However, there will be at least one Grace Period near the end of the semester in order to make up some missed assignments.

December 2019

| Monday | Tuesday | Wednesday | Thursday | Friday |
|--|---|---|--|---|
| 2 Web Project 2 Due & Extra Credit | 3 Z. Circle Of Fifths | 4 Reading Day | 5 FINAL (A-Z) Open Time 11:30 - 4:30 | 6 FINAL (A-Z) Open Time 11:30 - 4:30 |
| 9 FINAL (A-Z) Open Time 8:00 - 2:30 | 10 FINAL (A-Z) Open Time 8:00 - 11:00 | 11 FINAL (A-Z) Open Time 11:30 - 4:30 | 12 | 13 |
| 16 | 17 | 18 | 19 | 20 |
| 23 | 24 | 25  | 26  | 27 |
| 30 | 31  | | | |



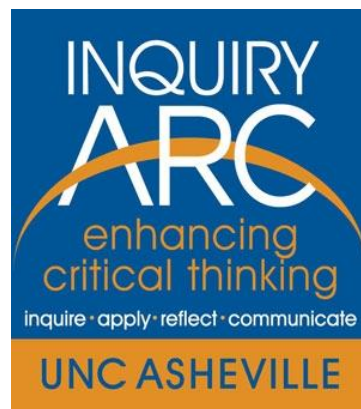
Section 1 (RRO 125): T-R 1:20-2:35 pm. **Section 2 (RRO 125):** T-R 3:15-4:30 pm.
For adverse weather consult your email, the UNCA Home Page, or the radio.

Music in PHYS 102, I-ARC, and CNN



expressions in the world.

The Physics of Sound and Music incorporates classical music, jazz, and popular music. Our course also includes the study of hearing loss and the psychology of perception. At times, your instructor, also a musician, will demonstrate musical concepts by performance, illustrating a diversity of musical styles. You will appreciate sound and its many applications and



We follow the *UNCA* I-ARC model: Inquiry (understanding the question or problem at hand), Apply (using the appropriate principle, law, or formula), Reflect (reflecting on the answer to verify its validity), and Communicate (finally giving the answer with confidence with proper units and significant figures).

Our course was a top science/technology news story on *CNN: E-Book Learning*, which aired on *NEXT@CNN*, August 31, 2002. You can bookmark <http://www.opus.unca.edu/sound/>

UNCA-WIDE Important Information

Title IX and Sexual Misconduct. [Note that the legal term “Responsible Employee” appearing below means “Mandatory Reporter.”] Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment, sexual exploitation, interpersonal violence, non-consensual touching, and sexual assault. UNC Asheville’s policy against sexual misconduct extends not only to employees of the university but to students as well. If you encounter unlawful sexual misconduct behavior or gender based discrimination, please talk to any University Responsible Employee (Mandatory Reporter). **All University employees (except Health and Counseling center employees and employed Campus Ministers are considered Responsible Employees (Mandatory Reporters) and are mandated to report incidents to the Title IX Office.**

The Title IX office consists of [Dr. Jill Moffitt](#), UNC Asheville’s Title IX Administrator, who can be reached at (828)232-5658. Individuals may also report anonymously at <https://police.unca.edu/anonymous-report>. For more information regarding Title IX and resources concerning sexual misconduct and its prevention please visit <https://titleix.unca.edu/>.

UNCA Chief of Police: [Chief Eric Boyce](#).

Accommodations and Academic Accessibility. UNC Asheville values the diversity of our student body as a strength as a critical component of our dynamics community. Students with documented special needs may require accommodations due to facilities, course design, technology used, or other campus resources. Students who experience a barrier to full access to this class should let the professor know and/or make an appointment to at the [Office of Academic Accessibility](#) as soon as possible at the beginning of the semester. All information will remain confidential. For more specific information please contact the Office of Academic Accessibility at (828)232-5050 or academicaccess@unca.edu, visit them in the [OneStop Student Services Center](#) or at their website <https://oaa.unca.edu/>.

Early Alerts. Faculty at UNCA are encouraged to use the university's Early Alert (EA) system to communicate with students about their progress in courses. When a faculty member submits an early alert that expresses a concern, the student receives an email from OneStop and meets with the professor to discuss the alert, completing a form as part of the process. It is in the student's best interest to complete the EA process quickly, as students who do so are more likely to earn credit for the course. Failure to complete the EA process will result in a registration hold; the student won't be able to register for the next semester's classes until they have met with the faculty member and turned in the required form. Questions about the EA system can be directed to [Anne Marie Roberts](#) (amrober1@unca.edu) in OneStop at 828(350-4502).

Academic Dishonesty. Note that any violations of academic dishonesty (cheating, signing someone else's quiz sheet, etc.) must be reported to the Provost's Office.