

# ***PHYS 102/122 The Physics of Sound and Music***

The Combination *PHYS 102/122* has no prerequisites.  
You can use this combination as a lab science or science perspectives. 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](mailto:ruiz@unca.edu)

**RESERVE 24 HOURS PER WEEK FOR THIS COURSE.**

**This is our Contract. Please READ everything carefully before agreeing to take 102/122.**

1. Class Attendance Due on Its Class Day: Watch Video, email me by the end of the day:  
“On my honor, I have watched the entire 75-minute video for Class \_\_\_\_\_. The quiz answer is \_\_\_\_\_.”  
(Give Class Letter such as A, B, C and note that the Quiz Question is given at end of each video lecture.)  
See Last Page for Making Up a Class.

2. Assignments: Homeworks HW A-Z, Labs 1-10, Projects 1-2.  
Assignments listed during each week are due the coming Saturday by 6 pm.  
Grace Period: You may work on your own without instructor assistance until Sunday, 11:59 pm.

3. Exams: Closed “Book/Notes/Everything” Except Calculator – HONOR CODE.

## **June 2020**

<b>Lab Week</b>	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
	1 ALWAYS	2 GET	3 AHEAD	4 OF	5 SCHEDULE
7 L1. Measurement	8 A. Sound HW A	9 B. Vibrations HW B	10 C. Waves HW C	11 D. Wave Applications HW D	12 E. Modulation HW E
14 L2. Waves	15 F1 Lissajous Figures	16 F2. Diatonic Scale HW F	17 G. Strings HW G	18 H. Pipes HW H	19
21 L3. The Oscilloscope & Project P1	22 Exam 1 (A-G)	23 I. Fourier Analysis HW I	24 J. The Moogerfooger HW J	25 K. The Laws Of E&M HW K	26
28 L4. Modulate L5. Scale	29 L. Sound Systems HW L	30 M. Analog Electronics HW M			

Last Day to Withdraw is June 29, 2020 (Always Double Check Date with Registrar).

Website: [www.opus.unca.edu/sound/](http://www.opus.unca.edu/sound/) or Google **unca light**

## July 2020



Lab Week	Monday	Tuesday	Wednesday	Thursday	Friday
			1 N1. Tuners	2 Special Grace Day for Late Work	3 Eve of July 4 <sup>th</sup> Holiday
5 L6. Harmonics Exam Study	6 Exam 2 (H-N) & Lab Exam LE1 (L1 - L5)	7 N2. Digital Electronics HW N	8 O. Signal Processing HW O	9 P. Moog Synthesizer I HW P	10 Q. Moog Synthesizer II HW Q
12 L7. Fourier Spectra, L8. Digital	13 R. The Ear HW R	14 S. Perception HW S	15 T. Audiology HW T	16 U. Spectrograms HW U	17
19 L9. Spectrograms L10. Sounds	20 V. Musical Temperament HW V	21 W. Woodwind Instruments HW W	22 X. Brass Instruments HW X	23 Exam 3 (O-U)	24
26 Project P2	27 Y. String Instruments HW Y	28 Z. Circle of Fifths HW Z	29 All Work Due Grace Day for Late Work	30 Study for the Final and LE2	31 FINAL (A-Z) Lab Exam LE2 (6-10)



### Class Resources and Goodies

1. **Online Text:** [www.opus.unca.edu/sound/](http://www.opus.unca.edu/sound/) Everything is there: text, tutorials, notes, assignments. Our website is like a cruise ship and was a top story on CNN: See <http://www.mitruiz.com/television.php>
2. **Class Attendance:** You can miss 2 classes, but there is a bonus (10) for attending all classes. See Class Attendance on the first page for how you get attendance points and the last page for make-up.
3. **Lab Attendance:** You get lab attendance if you do 13 or 25 on time, but need 25 of 25 for full credit.
4. **Notes:** You get access to "Power Notes," guided sheets you can fill in class. See Downloads.
5. **Homework:** See the Calendar. Remember Saturday 6 pm and the Grace Period on page 1.
6. **Projects:** See the Calendar for when these occur.
7. **Labs:** See the Calendar. Note that the Lab is a separate course, PHYS 122.
8. **Office Hours and The Forum:** Help your peers out with assignments on our 24/7 online discussion forum. We will also schedule some Zoom Office hours each week based on your availability.
9. **Extra Credit for 101:** Do questions in the text (the Blue) up until July 29.
10. **Your Responsibilities:** 1)Time: 24 hours per week since during a regular semester it is 12 hours per week (3 for class, 3 for lab, 6 for HW, P1, P2, and exam study); 2)Self-Learning: You can deal effectively with learning mostly on your own; 3)Schedule: You can keep to a schedule; 4)Perseverance: when confronted with critical-thinking questions, you do not give up, but meet the challenge; 5)Forum: You post any questions you have on the Forum and you enjoy communication by writing.

## August 2020

Monday	Tuesday	Wednesday	Thursday	Friday
3	4	5	6	7
10	11	12	13	14
17	18	19	20 	21 
24	25	26	27	28
31				

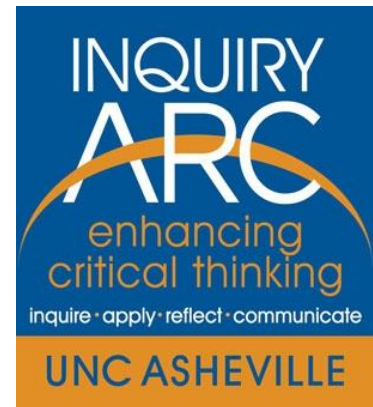
HAPPY  
PARSI  
NEW  
YEAR



### Music in PHYS 102, I-ARC, and CNN



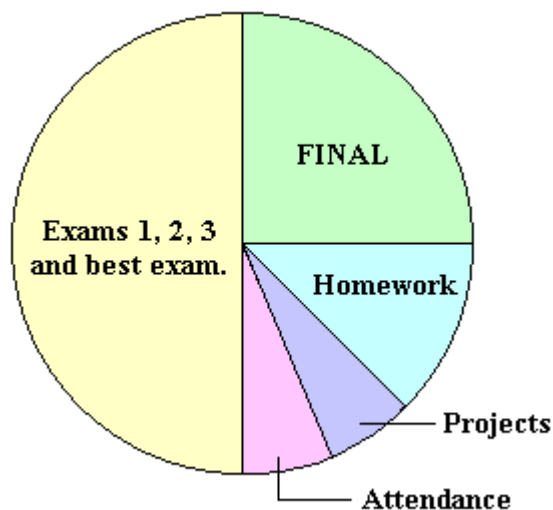
*The Physics of Sound and Music* incorporates classical music, jazz, and popular music. Our course also includes the study of hearing loss and the psychology of perception. At times, your instructor, also a musician, will demonstrate musical concepts by performance, illustrating a diversity of musical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



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/>

**PHYS 102 Grading** (This course typically has a class grade point average in the 2.6 to 2.8 range).



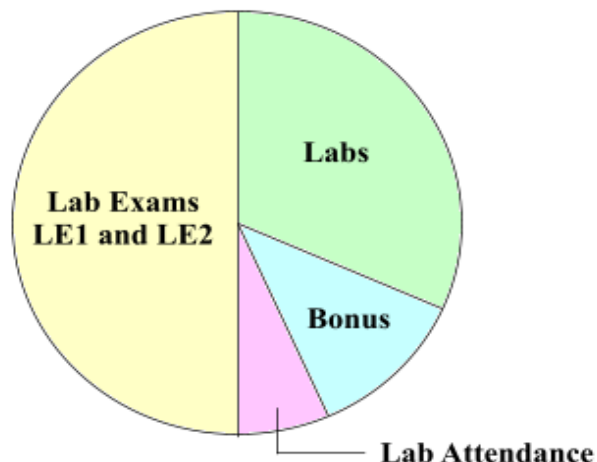
- 100 Exam 1 aka E1
- 100 Exam 2 aka E2
- 100 Exam 3 aka E3
- 200 Final aka FN
- 100 Best Exam Percentage
- 100 Web Homework (Due Weekly)
- 50 Two Web Projects (25 points each)
- 50 Minus 5 per miss after 2 free misses
- 800 Total** (No + or - Grades, See Below)

- 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, put in effort with homework (HW), P1, P2, and extra credit. For very close cases I will also look for a strong Final. You may also retake E1, E2, and/or E3.

**Class Make-Up:** You may make up a class video late by watching the video and doing 4 extra credits for that class. You then get the attendance points plus the extra credit.

**PHYS 122 Grading** ((This course typically has a class grade point average in the 2.6 to 3.0 range).



- 200 Lab Exam 1 aka LE1
- 200 Lab Exam 2 aka LE2
- 250 Labs (for getting all 25 "happies" per lab)
- 100 Bonus (+10 for getting at least 18 per lab)
- 50 Attendance (+5 for getting at least 13 per lab)
- 800 Total** (No + or - 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

**Borderline:** If your grade is borderline, I will consider helping you if you have a near perfect lab, which means you received over 23 "happies" out of the max of 25 possible for each lab. I can help you out the most if you have all 25 "happies" out of the max of 25 possible for each lab. You can retake LE1.

