



# COURSE SYLLABUS

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## Course Prefix, Number, and Title

DAD 492 – Sound Forensics

## Credits

3

## University Name

Dakota State University

## Academic Term/Year

Spring 2026

### Last date to Drop and receive 100% refund

January 21, 2026

### Last date to Withdraw and earn a grade of 'W.'

April 7, 2026

## Course Meeting Time and Location

Tuesday / Thursday 1:00 pm – 2:15 pm TCB 209

## Instructor Information

### Name

Tate Carson

### Office

TCB 305

### Phone Number(s)

605-681-6183

### Email Address

Tate.carson@dsu.edu

### Office Hours

Mondays and Fridays 10:00–12:00; Wednesdays 10:00–12:00 and 1:00–2:00; Tuesdays 2:30–3:30; additional meetings available by appointment.

## Approved Course Description

### Catalog Description

Includes current topics, advanced topics and special topics. A course devoted to a particular issue in a specified field. Course content is not wholly included in the regular curriculum. Guest

artists or experts may serve as instructors. Enrollments are usually of 10 or fewer students with significant one-on-one student/teacher involvement.

### **Additional Course Information**

This course is an introduction to audio forensics, a branch of forensic science. Audio forensics is the application of the science of digital audio to legal matters. This niche field of forensics has grown exponentially in recent years due to the near ubiquity of devices capable of producing audio forensic evidence, such as smartphones and surveillance cameras. Some recordings captured every day will inevitably be considered valid evidence in an investigation.

## **Prerequisites**

### **Course Prerequisite(s)**

None

### **Technology Skills**

Basic audio editing knowledge

## **Student Learning Outcomes**

By the end of this course, students will be able to:

1. Identify and accurately use core terminology, concepts, and historical precedents in forensic audio analysis, including authenticity principles, chain of custody, and landmark case studies.
2. Explain how physical acoustics, psychoacoustics, and digital audio systems influence the capture, perception, and interpretation of forensic sound evidence.
3. Apply standard forensic audio tools and methods to examine recordings for authenticity, integrity, and evidentiary relevance.
4. Analyze and interpret audio evidence by integrating signal analysis, environmental acoustics, and probabilistic reasoning to assess competing hypotheses.
5. Produce professionally structured forensic audio reports and oral explanations that meet scientific, technical, and legal standards for expert testimony.

## **Course Materials**

### **Required Textbook(s)**

Digital Audio Forensics Fundamentals (**Available as an eBook in the DSU Library**)

### **Optional Materials**

Principles of Forensic Audio Analysis by Robert C. Maher

## **Course Delivery and Instructional Methods**

This is a Discussion/Recitation course. Topics are explored in this course through short lectures, class discussion, instructor guided activities, individual student projects, and collaborative work. Students must come prepared to discuss the assigned material, which could be a reading, podcast, or YouTube video.

## Communication and Feedback

### Preferred Email Contact Method

Tate.carson@dsu.edu

### Email Response Time

Within 48 hours when class is in session.

### Feedback on Assignments

Within one week of the assignment due date.

## Evaluation Procedures

### Assessments

Attendance and In-Class Participation: 20%

Laboratory Exercises and Technical Assignments: 30%

Case Studies and Written Analyses: 20%

Midterm Project and Examination: 20%

Final Forensic Expert Report: 10%

### Final Examination

90% and above = A

80%-89% = B

70%-79% = C

60% - 69% = D

59% or below = F

### Performance Standards and Grading Policy

90% and above = A

80%-89% = B

70%-79% = C

60% - 69% = D

59% or below = F

## Tentative Course Outline and Schedule

Week	Date	Topics, Assignments, Quizzes, Tests, Deadlines
1	1/12	Introduction to forensic audio; authenticity, enhancement, interpretation; historical case studies (Watergate, McKeever).
2	1/19	Acoustics and signal propagation; wavelength, frequency, inverse square law, reverberation.
3	1/26	Psychoacoustics and digital audio fundamentals; hearing, masking, sampling, perceptual coding.
4	2/2	The forensic workbench; waveform vs. spectrogram; critical listening; lab on spectrographic analysis.
5	2/9	Authenticity I; analog tape, splices, and edit detection; lab on identifying edits.
6	2/16	Authenticity II; ENF analysis, metadata consistency, reverberation continuity; ENF and metadata labs.
7	2/23	Midterm examination and midterm project work.
8	3/2	Audio enhancement I; filtering, dynamics, intelligibility vs. quality; enhancement lab.

Week	Date	Topics, Assignments, Quizzes, Tests, Deadlines
9	3/9	Audio enhancement II; spectral subtraction, click removal, artifact evaluation; enhancement lab.
10	3/16	Forensic interpretation and geometry; TDOA, Doppler effect, distance estimation; problem set.
11	3/23	Speaker recognition and probability; likelihood ratios, biometric variability; disguised voice lab.
12	3/30	Gunshot acoustics I; physics and firearm sound signatures; ballistic spectrogram lab.
13	4/6	Gunshot acoustics II; complex shooting incidents, taser analysis; case study.
14	4/13	Cockpit voice recorders; aviation investigations and major case studies.
15	4/20	The expert witness; expert reports, testimony standards, cross-examination; final project workshop.
16	4/27	Final examination and course wrap-up.

## Student Success Services and Supports

### ADA Accommodations

Dakota State University strives to ensure that physical resources, as well as information and communication technologies, are reasonably accessible to users to provide equal access to all. If you encounter any accessibility issues, you are encouraged to immediately contact the instructor of the course and Dakota State University's Office of Disability Services, which will work to resolve the issue as quickly as possible.

DSU's Office of Disability Services is located in the Learning Engagement Center and can be contacted by calling 605-256-5121 or emailing [dsu-ada@dsu.edu](mailto:dsu-ada@dsu.edu). Students seeking ADA accommodations (such as non-standard note taking or extended time and/or a quiet space taking exams and quizzes) can access the DSU website <https://dsu.edu/student-life/disability-services/index.html> for additional information and the link to the Disability Services Request Form. You will need to provide documentation of your disability and the ADA Coordinator must confirm the need before officially authorizing accommodations.

### DSU Knowledge Base

The DSU Knowledge Base contains links and resources to help students by providing information about the following topics: User Accounts & Passwords, Academic Tools & Resources, Software & Apps Support, WiFi & Network Access, Campus Emergency Alert System, Campus Printing, IT Security & Safe Computing, and the Support Desk (which is there to help both on and off-campus students). The Knowledge Base can be accessed through the link below:

- [DSU Knowledge Base](#)

### D2L Support for Students

The D2L Support for Students site is designed to provide DSU students a D2L support resource center that contains user guides, tutorials, and tips for using the D2L learning environment. The D2L Support for Students site can be accessed through the link below:

- [DSU D2L Support Resources for Students](#)

## Classroom Policies

### Attendance and Make-up Policy

Students are expected to attend all scheduled classes. After **three** absences, 10 points will be deducted from the attendance grade for each additional absence.

Late work will only be accepted with a documented excuse. Students may redo work they received an undesirable grade on once, but only if they turned in something by the original due date. The deadline for redoing work is a week after the original due date. After this time, no late work will be accepted.

## DSU Policies

### Complaint Procedure

Dakota State University seeks to resolve student concerns and complaints in a fair and prompt manner. Students may file a complaint using the [DSU Concerns and Feedback form](#). SARA complaints from out-of-state students may be filed using the procedures noted [here](#).

### Grade Appeal Policy

If a student believes the final grade assigned in a course was inappropriate, he/she may appeal that grade by filing a formal grade appeal within 15 days of the start of the next academic session. Please see the DSU policy on [Appealing Academic and Administrative Decisions](#) for the required process and form to appeal a final grade.

### Student Verification Statement and Proctoring Policy

Federal law requires that universities verify the identity of students when course materials and/or course assessment activities are conducted either partially or entirely online. A student's Desire2Learn (D2L) login and password are intended to provide the student with secure access to course materials and are also intended to help the university meet this federal mandate. Some DSU Faculty also require the use of a proctor for exams in distance-delivered (Internet) courses and this requirement provides a second level of student identity verification. Students are responsible for any proctoring fees, if applicable. Finally, an instructor who uses web conferencing technology may require students to use a webcam during exams as another means of student identity verification through voice and visual recognition.

<< For online courses, include the verification method used for the course (i.e., proctoring, portfolio, oral exam, student observation, etc.) >>

## South Dakota Board of Regents Policy Statements

### Freedom in Learning Statement

Under Board of Regents and Regental Institutions policy, student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Discussion and debate are critical to education and professional development. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. While the exploration of controversial topics may be an important component of meeting the student learning outcomes in a course, no student will be compelled or directed to personally affirm, adopt, or adhere to any divisive concepts (as defined in SDCL 13-1-67). Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions

or conduct unrelated to academic standards should contact their home institution to initiate a review of the evaluation.

### **ADA Statement**

The Regental Institutions strive to ensure that physical resources, as well as information and communication technologies, are reasonably accessible to users to provide equal access to all. If you encounter any accessibility issues, you are encouraged to immediately contact the instructor of the course and the Office of Disability Services, which will work to resolve the issue as quickly as possible. Please note: if your home institution is not the institution you are enrolled at for a course (host institution), then you should contact your home institution's Office of Disability services. The disability services at the home and host institution will work together to ensure your request is evaluated and responded to in a timely manner.

### **Academic Dishonesty and Misconduct**

Cheating and other forms of academic dishonesty and misconduct run contrary to the purposes of higher education and will not be tolerated. Academic dishonesty includes, but is not limited to, plagiarism, copying answers or work done by another student (either on an exam or an assignment), allowing another student to copy from you, and using unauthorized materials during an exam. The Regental Institution's policy and procedures on cheating and academic dishonesty can be found in your home institution's Student Handbook and the governing Board of Regents policies can be found in [BOR Policy 2.9.2](#) and [BOR Policy 3.4.1](#). The consequences for cheating and academic dishonesty are outlined in policy.

### **Acceptable Use of Technology**

Acceptable Use of Information Technology Resources: While Regental Institutions strive to provide access to computer labs and other technology, it is the student's responsibility to ensure adequate access to the technology required for a course. This may include access to a computer (not Chromebooks, iPads, etc.), webcam, internet, adequate bandwidth, etc. While utilizing any of the information technology systems students, faculty and staff should observe all relevant laws, regulations, [BOR Policy 7.1](#), and any institutional procedural requirements.

### **Emergency Alert Communication**

In the event of an emergency arising on campus under [BOR Policy 7.3](#), your Regental Home Institution will notify the campus community via the emergency alert system. It is the responsibility of the student to ensure that their information is updated in the emergency alert system. The student's cell phone will be automatically inserted if available and if not, their email address is loaded. Students can at any time update their information the student alert system.