

# EAS 6138 - Gasdynamics

S. Roy, Professor, roy@ufl.edu

## Prerequisites

EAS 4103 or EML 5714 or any course in one-dimensional compressible flow.

## Course Objective

The objective of this course is to explore concepts related to Gasdynamics and compressible flows. The course will use the basic understanding of one-dimensional isentropic flow as the starting point and expand into more advance concepts of compressible flows. The skills developed in this class are important to a variety of mechanical and aerospace engineering applications.

## Topics

Below is an approximate list of the topics that will be covered in this class.

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Review of 1-D isentropic concepts	Linearized flow equations
Wave propagation	Transonic flows
Shock Tubes	Method of characteristics
Oblique shocks and wedge flows	Potential Flow
Thin airfoil theory	Compressible Boundary Layers
Multi-dimensional compressible flow	Special Topics Numerical Methods

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## Text and Other Resources

- ❑ **Class Text:** Elements of Gasdynamics, by H. Liepman and A. Roshko, Dover Publications. .
- ❑ **Supplemental Text:**
  - ❑ Zucrow and Hoffman, "Gas Dynamics," Volume 1, Wiley, 1976
  - ❑ Anderson, "Modern Compressible Flow," McGraw Hill, 1990
  - ❑ Schreier, "Compressible Flow," Wiley, 1982

## Course web page

- Maintained through UF and can be found by signing into Sakai at lss.at.ufl.edu

## Grade Determination

Paper Review/Homework	20% (to be assigned)
Exams	40% (around 7th week and 14th week)
<u>Project (see note below)</u>	<u>40% (at the conclusion of this course)</u>
<b>Total</b>	<b>100%</b>

**Project:** Discuss any project idea that you may have that is suitable for this course. This should be finalized by the middle of the semester. You may write your own code to design a nozzle or use available CFD software to solve a problem of your interest.

## **Instructor Information**

Dr. Subrata Roy, Professor, Department of Mechanical and Aerospace Engineering

Office: Zoom (held online via <https://ufl.zoom.us>), Email: [roy@ufl.edu](mailto:roy@ufl.edu)

Hours: TBD

## **Course Schedule**

### Lecture Recording Links (Viewing Schedule)

Lecture 1 (1/10)	Lecture 2 (1/10)	Lecture 3 (1/12)	Lecture 4 (1/17)	Lecture 5 (1/17)
Lecture 6 (1/19)	Lecture 7 (1/24)	Lecture 8 (1/24)	Lecture 9 (1/26)	Lecture 10 (1/31)
Lecture 11 (1/31)	Lecture 12 (2/2)	Lecture 13 (2/7)	Lecture 14 (2/7)	Lecture 15 (2/9)
Lecture 16 (2/14)	Lecture 17 (2/14)	Lecture 18 (2/16)	Lecture 19 (2/21)	Lecture 20 (2/21) E
Lecture 21 (2/23)	Lecture 22 (2/28)	Lecture 23 (2/28)	Lecture 24 (3/2)	Lecture 25a (3/7)
Lecture 25b (3/7)	Lecture 26 (3/9)	Lecture 27 (3/21)	Lecture 28 (3/21)	Lecture 29 (3/23)
Lecture 30 (3/28)	Lecture 31 (3/28)	Lecture 32 (3/30)	Lecture 33 (4/4)	Lecture 34 (4/4)
Lecture 35 (4/6)	Lecture 36 (4/11)	Lecture 37 (4/11)	Lecture 38 (4/13)	Lecture 39 (4/18)
Lecture 40 (4/18) E	Lecture 41 (4/20)	Lecture 42 (4/25) A	Lecture 43 (4/25) A	

E - also exam dates, A - Additional lecture

## **Personal Responsibility**

You are personally responsible for all information disseminated during the lectures. This means knowing homework due dates, what material they will cover, knowing when the project is due, and knowing all material, handouts, and announcements made in the lectures, whether or not you were present. Importantly, this is a graduate course. DO NOT expect the lecture to cover everything. Some parts of your homework and project may cover materials on the subject that are available in published literature and on the internet.

## **Late / Makeup Work**

Students are permitted one late HW submission, provided the HW is handed in prior to the posting of the solution. The request for this extension must be made to the instructor before the due date of the assignment.

### ***Students Requiring Accommodations***

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

### ***In-Class Recording***

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, [jpennacc@ufl.edu](mailto:jpennacc@ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

### **Software Use**

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### **Student Privacy**

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

### **Campus Resources:**

#### Health and Wellness

##### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

##### **Sexual Discrimination, Harassment, Assault, or Violence**

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)

##### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

#### Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Connections Center**, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.  
<https://teachingcenter.ufl.edu/>.

**Writing Studio**, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.  
<https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

**On-Line Students Complaints:** <https://distance.ufl.edu/state-authorization-status/#student-complaint>.