# MES 302 Course Syllabus

MES 302 – Mechanical Engineering Systems Lab 1

Spring 2025

## Instructor Information

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| --- | --- | --- | --- | --- |
| Name | Office Phone | Mobile Phone | Email | Office Location |
| Dr. Bill Fortney | 252-514-5956 | 252-514-5956 | wbfortne@ncsu.edu | STEM 108 |

### Office Hours

I am available for in-person or virtual office by appointment as needed. Please email me if you want to connect virtually and I will provide a Zoom link.

### Preferred Method of Communication & Response Time

* **Preferred method of communication:** If you need to contact me directly, my preferred method of communication is email. You can expect to receive a response within two business days (i.e. not over the weekend). If I email you directly (not a group email to the class), please strive to respond to me within two business days. It is recommended that you check your NC State email at least once a day to stay on top of course communications.
* **Asking questions about the course:** If you have a question about the course or its content, you can ask me in-class, stop by during office hours, or email me. You can expect to receive a response within two business days (i.e. not over the weekend).
* **Email guidelines:** Always include a descriptive, specific but concise subject. Include your course number and section in your email, and provide adequate context for your question in order to ensure full understanding of your email. Be sure to use your NC State email account.

## Course Information

**Course Website**: [NC State WolfWare](https://wolfware.ncsu.edu/courses/my-wolfware/)

**Meeting Time and Location: Friday 9:30am - 12:30pm STEM 132 OR STEM 111**

**Course Credit Hours**: 2 Credit Hours (1-Lecture 1-Non-Self-Contained Lab) 3 Contact Hours Each Week

### Catalog Description

This is the first course in a series of two mechanical engineering systems laboratory courses (MES 302 and MES 400). In each course, students apply the measurement and experimental techniques learned in MES 201 to explore and verify key theoretical mechanical engineering concepts. Students learn to write a variety of common technical reports such as engineering memos and formal engineering laboratory reports. MES 302 focuses on the fields of mechanical vibrations, fluid mechanics, dynamics of machines, PID controls, and Simulink programming. The course requires a field trip to a local business, and students will be required to provide or arrange for their own transportation.

### Structure

This course is composed of three main components – pre-laboratory assignments, laboratory time, post-laboratory assignments.

* **Pre-Laboratory Quiz and/or Assignment**

Before some laboratory sessions, material will be provided to help review the information required for a successful laboratory experience. The assigned pre-laboratory review assignments must be completed individually by each student before conducting the laboratory exercise. Students not completing the pre-laboratory exercise before their lab time will receive a grade of zero for the pre-lab and a 15% reduction of grade on the post-lab.

* **Lecture/Laboratory Time**

The laboratory instructor will spend approximately one hour discussing the theoretical concepts for the laboratory exercise, and then students will spend the next two hours conducting the laboratory exercise.

* **Post-Laboratory Assignment**

After laboratory experiments, an assignment may be given to reinforce the work done. Unless prior arrangements are made, students must be present for the laboratory exercise to be able to turn in post-laboratory work. Students not completing the pre-lab material before their lab time will receive a 15% reduction in the post-lab assignment grade.

### Meeting Time and Tool Used

**Face-to-Face meeting time is Friday 9:30 am – 12:30 pm STEM 132**

### Prerequisites/Corequisites

Prerequisites: MES 301, MAE 308, MAE 315

Corequisites: MAE 435

### Minimum Technical and Digital Information Literacy Skills

Required Technical Skills

* Navigate and use Moodle, NC State’s Learning Management System.
* Use Gmail, including attaching files to email messages
* Create and submit files in commonly used word processing program formats (MS Word, text editors, Google Docs).
* Download and upload attachments
* Use spreadsheets, presentations, graphics programs, and other applications in digital environments
* Use web conferencing tools including Zoom
* Post to discussion boards and forums

### General Education Program (GEP) Information

#### GEP Category Fulfilled

None

#### GEP Corequisites

None

## Learning Outcomes

Upon completion of this course, students will be able to:

1. Calculate the total uncertainty for a set of measurements using the Kline McClintock Method of Experimental Uncertainty.
2. Describe the behavior of the boundary layer along various bluff bodies in a wind tunnel.
3. Calculate discharge coefficients for a variety of orifice plates using measured and theoretical flow rates.
4. Calculate frictional pressure losses through different sizes of pipe given experimental data.
5. Identify factors that affect the natural frequency of a cantilever beam.
6. Calculate the theoretical natural frequency for a system.
7. Determine the natural frequency of a system using accelerometers.
8. List the Six Cs of effective technical writing.
9. Identify examples of passive voice used in a provided technical writing sample.
10. Create a formal engineering laboratory report.

## Course Materials

### Required textbook

None – Electronic Material Provided in Moodle

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### Other required materials

None.

### Optional materials

None.

### Safety

* Lab safety is everyone’s responsibility, and no one should work with a piece of equipment in the lab until they have been properly trained.
* Each student should review the Lab Safety Manual.
* Lab instructors will train students, show students the location of safety equipment in the laboratory, and review any required precautions necessary for safely operating each piece of equipment.

## Technology Requirements

Computers are available for student use in the MES lab room.

### Computer

A laptop computer is recommended for students taking this course. NC State’s Online and Distance Education provides technology requirements and recommendations for computer hardware, and NC State’s Office of Information Technology provides recommendations for [your computer at NC State](https://oit.ncsu.edu/my-it/hardware-software/your-computer/).

### Other devices

None.

### Software and digitally-hosted course components

The following software and tools will be used in this course. Some tools are a part of NC State’s enterprise tools. See [information about their purpose, how to access them, accessibility information, and privacy policies](https://go.ncsu.edu/a11y_privacy_instructionaltech). The same information for any other tools required in this course is provided in the list below.

* Microsoft Word, PowerPoint, and Excel
* Moodle
* Zoom

## Other Student Expenses

* Course may require a field trip to a local business and students will be required to provide or arrange for their own transportation. Non-scheduled class time for field trips or out-of-class activities is NOT required for this class.

## Communication Guidelines

### Respecting our learning community

The [NC State Code of Student Conduct](https://policies.ncsu.edu/policy/pol-11-35-01/) outlines expectations for behavior in the classroom (whether virtual or physical) and the consequences for students who violate these expectations. Any behavior that impacts other students’ ability to learn and succeed will be addressed, but expressing diverse viewpoints and interpretations of course content is welcome.

Community guidelines for this course include:

* Use a respectful tone in all forms of communication (email, written, oral, visual)
* Maintain professionalism (avoid slang, poor grammar, etc.) in your written communication.
* Respect regional dialects and culturally embedded ways of oral communication.
* Stay home or in your dorm room if you are exhibiting symptoms of a contagious illness (fever, chills, etc.).
* Enter our virtual and/or physical classroom community respectfully by refraining from lewd or indecent speech or behavior, helping to maintain a safe physical environment, not using your cell phone for voice or text communication except when explicitly given leave to do so, and not attending class under the influence of any substance.
* Treat each community member with respect by not recording others without their consent or engaging in any form of hazing, harassment, intimidation, or abuse.
* Respect cultural differences that may influence communication styles and needs.

### Plan for interaction between instructors and students

I will communicate with you through email, in-class announcements, and through Moodle.

### Expectations for learner participation and interaction

Some course activities including synchronous class sessions, Moodle Forums, and group work will require you to interact with other students in the course. Communication expectations including frequency and content are detailed in the information about each assignment or activity when it appears in the course.

## Grading and Feedback

### Grading criteria, details, and timing of feedback

| **Component** | **Weight** | **Details** |
| --- | --- | --- |
| **Pre-Labs Quizzes & Assignments** | **20%** | Before some laboratory sessions, material will be provided to help review the information required for a successful laboratory experience. The assigned pre-lab work must be completed before conducting the laboratory exercise. Pre-lab material will be turned in at the start of lab, and students not completing the pre-laboratory assignment will receive a grade of zero on the laboratory pre-lab assignment and 15% **grade reduction** on the laboratory post-lab assignment. |
| **Post-Lab Homework Assignments** | **80%** | After laboratory experiments, an assignment may be given to reinforce the work done. These assignments will help the students process and analyze the laboratory experience and allow them to practice various forms of technical documentation.  |
| **Attendance** |  | Unless prior arrangements are made, students must be present for the laboratory exercise to be able to turn in post-laboratory work. |

\* Modifications to the timing of grades/feedback, if required, will be announced via email.

### Grading scale

|  |  |  |
| --- | --- | --- |
| **Low** | **Letter** | **High** |
| 97 ≤ | A+ | ≤ 100 |
| 93 ≤ | A |  < 97 |
| 90 ≤ | A- |  < 93 |
| 87 ≤ | B+ |  < 90 |
| 83 ≤ | B |  < 87 |
| 80 ≤ | B- |  < 83 |
| 77 ≤ | C+ |  < 80 |
| 73 ≤ | C |  < 77 |
| 70 ≤ | C- |  < 73 |
| 67 ≤ | D+ |  < 70 |
| 63 ≤ | D |  < 67 |
| 60 ≤ | D- |  < 63 |
| 0 ≤ | F |  < 60 |

### Requirements for earning a grade of “Satisfactory”

In order to receive a grade of S, students are required to take all exams and quizzes, complete all assignments, and earn a grade of C- or better. Conversion from letter grading to credit only (S/U) grading is subject to university deadlines. For more information, see the [Credit Only Courses regulation](https://policies.ncsu.edu/regulation/reg-02-20-15/).

Requirements and procedures for auditing this course

Auditing this course is approved on a case-by-case basis. Please contact the course instructor to attain approval. Refer to the [Audit regulation](https://policies.ncsu.edu/regulation/reg-02-20-04/) for more information and links to required forms.

## Course Schedule

Please note: the course schedule is subject to change.



## Course Policies

### Proctored exams

Unless otherwise stated, exams will be taken in the course classroom and proctored by the instructor.

### Late assignments

Assignments are due by the date posted in Moodle for each assignment. Late submissions for pre-lab assignments will not be accepted. Late submissions for post-lab assignments will result in a deduction of ten points for each day they are late.

### Incomplete grades, withdrawals

Information on incomplete grades can be found at [REG 02.50.03 – Grades and Grade Point Average](https://policies.ncsu.edu/regulation/reg-02-50-03/). If you encounter a serious disruption to your work not caused by you and you would have otherwise successfully completed the course, contact your instructor as soon as you can to discuss the possibility of earning an incomplete in the course for the semester, including an agreement on when the remaining work must be done in order to change the grade to the appropriate letter grade.

If you must withdraw from a course or from the University due to hardship beyond their control, see [Withdrawal Process and Timeline | Student Services Center](https://studentservices.ncsu.edu/your-classes/withdrawal/process/) for information and instructions.

### Attendance

* Attendance is required at all class meetings, and work missed during class will be handled as described below. If possible, students are expected to inform the instructor through email of any absence in advance and documentation for excused absences must be given through email to the instructor within one week of the student’s return. A maximum of four excused absences is allowed in this course.
* Two percentage points will be accumulated for each late arrival, and the accumulated points will be deducted from the laboratory post-lab assignment in which the late arrival occurred.
* Unless previous arrangements have been made, students who miss class due to an unexcused absence will not be allowed to make up any work completed during the class period, and any work due will be considered late. Students who miss a class due to an excused absence should talk with the instructor upon their return to arrange for any missed work to be completed.
* Students with a documented excused absence as described above will be given one week from their return to school to turn in any missed work. After this week, the assignment will be considered late as described in the late assignment.
* University attendance/absence Policy, along with a definition of excused absences can be found in the Related NC State Policy: [REG 02.20.03 – Attendance Regulations](https://policies.ncsu.edu/regulation/reg-02-20-03-attendance-regulations/)

## University Policies

### Academic integrity and honesty

Students are required to comply with the university policy on academic integrity found in the [Code of Student Conduct 11.35.01 sections 8 and 9](http://policies.ncsu.edu/policy/pol-11-35-01). Therefore, students are required to uphold the Pack Pledge: “I have neither given nor received unauthorized aid on this test or assignment.” Violations of academic integrity will be handled in accordance with the [Student Discipline Procedures](https://policies.ncsu.edu/regulation/reg-11-35-02/).

Please refer to the [Academic Integrity](https://studentconduct.dasa.ncsu.edu/academic-integrity-overview/) web page for a detailed explanation of the University’s policies on academic integrity and some of the common understandings related to those policies.

Violations of academic integrity will be handled in accordance with the Student Discipline Procedures ([NCSU REG 11.35.02](https://policies.ncsu.edu/regulation/reg-11-35-02/)).

### Student privacy

#### Originality Checking Software

* Software is not used in this course to detect the originality of student submissions.

#### Class recording statement:

* In-class sessions may be recorded in such a way that might also record students in this course. These recordings MAY be used beyond the current semester or in any other setting outside of the course. Contact your instructor if you have concerns. A student’s full names will not be able to be identified in any course recordings, or the course will not be recorded at all.

#### Class privacy statement:

* This course requires online exchanges among students and the instructor, but NOT with persons outside the course. Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web postings, where relevant to the course. Examples include online discussions of class topics and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

### Other Policies

Students are responsible for reviewing the NC State University PRR’s which pertain to their course rights and responsibilities:

* [Equal Opportunity and Non-Discrimination Policy Statement](https://policies.ncsu.edu/policy/pol-04-25-05) and [additional references](https://oied.ncsu.edu/equity/policies)
* [Code of Student Conduct](https://policies.ncsu.edu/policy/pol-11-35-01)
* [Grades and Grade Point Average](https://policies.ncsu.edu/regulation/reg-02-50-03)
* [Credit-Only Courses](https://policies.ncsu.edu/regulation/reg-02-20-15)
* [Audits](https://policies.ncsu.edu/regulation/reg-02-20-04)

## Student Resources

Academic and Student Affairs maintains a website with links for student support on campus, including academic support, community support, health and wellness, financial hardship or insecurity, and more. [Find Help on Campus.](https://dasa.ncsu.edu/support-and-advocacy/find-help/)

### Disability resources

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the [Disability Resource Office (DRO)](https://dro.dasa.ncsu.edu/). For more information on NC State’s policy on working with students with disabilities, please see the [Policies, Rules and Regulations page maintained by the DRO](https://dro.dasa.ncsu.edu/about-us/policies-rules-regulations/) and [REG 02.20.01 Academic Accommodations for Students with Disabilities](https://policies.ncsu.edu/regulation/reg-02-20-01/).

### Safe at NC State

At NC State, we take the health and safety of students, faculty and staff seriously. The [Office for Institutional Equity and Diversity](https://diversity.ncsu.edu/) supports the university community by providing services and resources to support and guide individuals in obtaining the help they need. See the [Safe at NC State webpage](https://diversity.ncsu.edu/safe/) for resources.

### Supporting Fellow Students in Distress

As members of the NC State Wolfpack community, we each share a personal responsibility to express concern for one another and to ensure that this classroom and the campus as a whole remain a healthy and safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you, either for the classmate’s well-being or yours. If you feel this way, I would encourage you to report this behavior to one of the MES staff.

## Course Evaluations

ClassEval is the end-of-semester survey for students to evaluate the instruction of all university classes. The current survey is administered online and includes 12 closed-ended questions and 3 open-ended questions. Deans, department heads, and instructors may add a limited number of their own questions to these 15 common-core questions.

Each semester students’ responses are compiled into a ClassEval report for every instructor and class. Instructors use the evaluations to improve instruction and include them in their promotion and tenure dossiers, while department heads use them in annual reviews. The reports are included in instructors’ personnel files and are considered confidential.

Online class evaluations will be available for students to complete during the last two weeks of the semester for full-semester courses and the last week of shorter sessions. Students will receive an email directing them to a website to complete class evaluations. These become unavailable at 8 am on the first day of finals.

* Contact ClassEval Help Desk: classeval@ncsu.edu
* [ClassEval website](http://go.ncsu.edu/cesurvey)

## Syllabus Modification Statement

Our syllabus represents a flexible agreement. It outlines the topics we will cover and the order in which we will cover them. Dates for assignments represent the earliest possible time they would be due. The pace of the class depends on student mastery and interests. Thus minor changes in the syllabus can occur if we need to slow down or speed up the pace of instruction. Changes made to the method of instructional delivery, course structure, course schedule, number of assignments, grading or other aspects of the course after the start of the term will be communicated to all students through email and/or through an announcement in the course Moodle site.