

Tompkins Cortland Community College

Master Course Syllabus

Course Discipline and Number: ENSC 137

Year: 2024-2025

Course Title: INTRODUCTION TO ENGINEERING

Credit Hours: 3

I. Course Description: This course introduces engineering students to the core features of the engineering discipline. Students will learn about careers and licensing, analytical techniques—including equations, graphics, and statistics. The course also introduces students to computer-aided analysis software—including Excel, MATLAB, and AutoCAD—and engineering applications—including analytical and graphical solutions. Students will also learn the basics of engineering design, ethics, safety, and economics. Prerequisites: Enrollment in a STEM program or microcredential. 3cr. (2 Lec. 2 Lab) fall semester.

II. Additional Course Information:

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| 1. This is a first-year course specifically tailored for students enrolled in the Engineering Science A.S. program. Its primary objective is to equip students with the knowledge and skills necessary for a seamless transition to a Bachelor's Degree program at other institutions. |
| 2. Successful completion of this course involves the submission of technical reports. |
| 3. A mandatory lab fee of approximately \$25 is applicable for enrollment in this course. |
| 4. To fulfill the requirements of this course, students are expected to dedicate a minimum of 2 hours to lectures and 2 hours to laboratory sessions per week throughout the 15-week semester. |

III. Student Learning Outcomes

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

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| 1. Demonstrate understanding of the core principles of multiple engineering disciplines and their career paths. |
| 2. Recognize the value of professional conduct and ethical practices in engineering. |
| 3. Apply analytical, graphical, and computer-based engineering techniques to address and solve engineering problems. |
| 4. Utilize appropriate word processing software for technical professional laboratory reports. |
| 5. Apply Spreadsheets, MATLAB, and AutoCAD for Solving Mathematics and Engineering Problems. |

IV. Tompkins Cortland Institutional Learning Outcomes; Program Learning Outcomes; SUNY General Education Competencies and Knowledge and Skills Areas

Tompkins Cortland ILOs

Complete this section for “service” courses only (e.g., courses that are required of all students; courses that are not

program specific but satisfy liberal arts requirements; or commonly used in multiple academic programs to meet non-program-specific requirements). Check only Institutional Learning Outcomes (ILOs) that are meaningfully developed and assessed in this course. For each ILO chosen, include the SLO to which it aligns.

Students will:

- ☐ Communicate effectively, in oral and written forms, taking into consideration audience and purpose.
- ☐ Apply principles and methods of scientific inquiry and quantitative reasoning appropriate to their discipline.
- ☐ Use information, critical thinking, and the creative process to solve problems and reach conclusions.
- ☐ Use technology appropriate to their discipline.
- ☐ Describe the ways in which social, economic, or environmental sustainability depends on their own and the collective contributions of a diversity of ideas and people.

Program Learning Outcomes

Complete this section for program-specific courses (e.g., those that share the same discipline code as the academic program or satisfy requirements in related programs). List the academic program(s) here and note which Student Learning Outcomes align to specific Programmatic Learning Outcomes. Please see the MCS Instructions for more details.

Specify the Academic Program: Engineering Science A.S.

Students will be able to:

PLO#1 Apply mathematical, scientific, computing, and engineering principles to solve engineering problems and design engineering components.

SLO#3 Apply analytical, graphical, and computer-based engineering techniques to address and solve engineering problems.

PLO#2 Conduct scientific experiments, gather accurate data, interpret the relationships among variables, and use engineering judgment to draw appropriate conclusions as a result of that analysis.

PLO#3 State laboratory processes and results in clear and precise written reports and oral presentations.

PLO#4 Use technology appropriate to current engineering practices.

SLO#5 Apply Spreadsheets, MATLAB, and AutoCAD for Solving Mathematics and Engineering Problems.

PLO#5 Recognize ethical and professional responsibilities in engineering situations and make informed judgments that consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SLO#2 Recognize the value of professional conduct and ethical practices in engineering.

SUNY General Education Competencies

If this course assesses a SUNY GEN ED Competency, check all that apply and indicate which course outcome(s) address each checked item:

- ☐ CRITICAL THINKING & REASONING- Students will:
 - a. clearly articulate an issue or problem;

- b. identify, analyze, and evaluate ideas, data, and arguments as they occur in their own or others' work; acknowledge limitations such as perspective and bias; and
- c. develop well-reasoned (logical) arguments to form judgments and/or draw conclusions.

Course SLO(s):

☐ INFORMATION LITERACY - Students will:

- a. locate information effectively using tools appropriate to their need and discipline; evaluate information with an awareness of authority, validity, and bias; and demonstrate an understanding of the ethical dimensions of information use, creation, and dissemination.

Course SLO(s):

☐ SUNY GENERAL EDUCATION KNOWLEDGE AND SKILLS AREA(s):

For courses that are approved to meet one (or more) of the ten SUNY General Education Knowledge and Skills Areas, indicate which area the course fulfills, and which outcome(s) are aligned with the SUNY outcomes for that area:

Course SLO(s):

☐ This course does not address any of the above Tompkins Cortland ILOs, PLOs, or SUNY General Education Competencies or Knowledge and Skills Areas.

V. Essential Topics/Themes

1. Introduction to Engineering
2. Ethics and professionalism
3. Roadmap to Succeed as an Engineer
4. Reasons for Studying Engineering
5. How to Study Engineering
6. The Professional Engineer, PE
7. Excel for Engineers
8. MATLAB for Engineers
9. Linear Algebra
10. Vector Products
11. Matrix Applications for Engineers
12. Coordinate Systems
13. AutoCAD for Engineers
14. Statistics for Engineers
15. Engineering Economics

VI. Methods of Assessment/Evaluation

Method	% Course Grade
1. Attendance and Participation	0-10%
2. Lab Reports (Minimum of 6)	15-25%
3. Quizzes and Exams	30-60%
4. Final Exam	20-30%

VII. Texts – ☐ Required ☒ Recommended ☐ Used for more than one course (list courses)

High school instructors may consult with staff in the CollegeNow office for additional information and guidance.

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1. S. Moaveni, Engineering Fundamentals: An Introduction to Engineering, 5th Edition, Three Lakes, WI: Cole Publishing Co, 2016. [ISBN13: 9781305084766 or ISBN10: 1305084764]	<input type="checkbox"/>

Editions listed are current as of date of syllabus. More recent editions may be used.

VIII. Bibliography of Supplemental Materials

1.

Editions listed are current as of date of syllabus. More recent editions may be used.

IX. Other Learning Resources

Audiovisual:

Electronic:

Other:

Attendance Policy: To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.

Services for Students with Disabilities: It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for academic adjustments. All course materials are available in alternate formats upon request.

Academic Integrity: Every student at Tompkins Cortland Community College is expected to act in an academically honest fashion in all aspects of their academic work: in writing papers and reports, in taking examinations, in performing laboratory experiments and reporting the results, in clinical and cooperative learning experiences, and in attending to paperwork such as registration forms.

Any written work submitted by a student must be their own. If the student uses the words or ideas of someone else, they must cite the source by such means as a footnote. Our guiding principle is that any honest evaluation of a student's performance must be based on that student's work. Any action taken by a student that would result in misrepresentation of someone else's work or actions as the student's own — such as cheating on a test, submitting for credit a paper written by another person, or forging an advisor's signature — is intellectually dishonest and deserving of censure.

Several degree programs offer student learning opportunities (such as internships, field work, and clinical experiences) outside the standard classroom setting. As part of the learning process, students must understand and engage in conduct that adheres to principles guiding employment within the professional workplace. These behaviors include, but are not limited to, academic integrity, accountability, reliability, respect, use of appropriate language and dress, civility, professional ethics, honesty, and trustworthiness. Disciplinary action may be initiated for inappropriate conduct occurring while participating in any course-related project or event.