Term Information

Effective Term	Autumn 2020

General Information

Course Bulletin Listing/Subject Area	Mathematics
Fiscal Unit/Academic Org	Mathematics - D0671
College/Academic Group	Arts and Sciences
Level/Career	Undergraduate
Course Number/Catalog	1154
Course Title	Calculus I for Engineering Technology
Transcript Abbreviation	Eng Tech Calc I
Course Description	Calculus I for Engineering Technology is the first in a two-course calculus sequence specifically designed for Engineering Technology. It covers standard Calculus topics including limits, differentiation, integration, optimization, and approximation with an emphasis on building mathematical intuition, problem solving ability and using appropriate technology to find solutions.
Semester Credit Hours/Units	Fixed: 4

Offering Information

Length Of Course	14 Week, 12 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus, Marion

Prerequisites and Exclusions

Prerequisites/Corequisites	A grade of C- or above in 1148 and 1149, or in 1144, 1150, or 150, or Math Placement Level L.
Exclusions	Not open to students with credit for any course 2153 or above, or for any quarter-system class 254.xx or above.
Electronically Enforced	Yes

Cross-Listings

Cross-Listings	

Subject/CIP Code

Subject/CIP Code	27.0101
Subsidy Level	Baccalaureate Course
Intended Rank	Freshman, Sophomore

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Apply appropriate mathematical tools to variety of scenarios in Engineering Technology through Trigonometry, Vectors, Derivatives, Integrals, Optimization and Approximation.

- Create, Manipulate and Interpret multiple representations of data through representations of data in 2-D and in 3-D in graphical and function forms; converting between different representations of data; and Interpreting relationships among variables.

- Demonstrate comfort with translating English description of a physical contexts into Math and back to English through understanding mathematical notation in various contexts; connecting mathematical operations ; and communicating and explaining math.

- Work in groups to solve complicated problems and enhance communication skills through independent work on related portions of a project and synthesize results; and communicating work using plain English sentences (presentations, progress reports).

- Set up a model and use technology where appropriate to simulate a system through viewing an unfamiliar situation, identifying key concepts, formulas; making predictions; creating a continuous model from a discrete data; and recognizing solutions.

Content Topic List

- Lines, vectors and parameterizations.
- Limits.
- Definition of derivatives and integrals.
- Fundamental Theorem of Calculus.
- Applications of integrals.
- Rules and formulas for derivatives of various functions.
- Harmonic motion.
- Maxima and minima; optimization.
- Volumes of revolution.
- Linear programming and least squares.

Sought Concurrence No

Attachments

- BSET- Math 1154 CalcForET 1 Syllabus Draft.docx: Syllabus

  (Syllabus. Owner: Husen,William J)

- 1154_1155_cover_letter.docx: Cover letter

  (Other Supporting Documentation. Owner: Husen,William J)

Comments

- Resubmitted after discussion. *(by Husen,William J on 11/07/2019 03:58 PM)*

- 10/07/19: Please include curriculum map. *(by Haddad,Deborah Moore on 11/07/2019 03:49 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Husen,William J	11/07/2019 12:23 PM	Submitted for Approval
Approved	Husen,William J	11/07/2019 12:39 PM	Unit Approval
Revision Requested	Haddad,Deborah Moore	11/07/2019 03:49 PM	College Approval
Submitted	Husen,William J	11/07/2019 03:58 PM	Submitted for Approval
Approved	Husen,William J	11/07/2019 03:58 PM	Unit Approval
Approved	Haddad,Deborah Moore	11/07/2019 04:03 PM	College Approval
Pending Approval	Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Oldroyd,Shelby Quinn Vankeerbergen,Bernadette Chantal	11/07/2019 04:03 PM	ASCCAO Approval

Math 1154 and Math 1155 – Calculus I-II for Engineering Technology

Math 1154 and Math 1155 is a two semester sequence of mathematics courses that has been developed in close cooperation with the College of Engineering and Department of Physics. These two courses are the foundational mathematics courses for the newly approved BEST program in Engineering. Math 1154 and 1155 over a variety of calculus topics and are aligned with both the Introduction to Engineering courses as well as the foundational physics courses in the BEST program. Math 1154 and 1155 are not intended to be a replacement for Math 1151 (Calculus I) or any other current mathematics courses, rather they are designed to meet the requirements of the BEST program, both in terms of course content and ABET standards.

Calculus I for Engineering Technology Math 1154

Instructor:
Email: Office:
Office Hours:
Carmen: *http://carmen.osu.edu*

Course Objectives

Calculus I for Engineering Technology is a 4-hr course designed to be the first in a two-course calculus sequence specifically designed for Engineering Technology. It covers standard Calculus topics including limits, differentiation, integration, optimization, and approximation with an emphasis on building mathematical intuition, problem solving ability and using appropriate technology to find solutions.

The skills you will learn from this class are closely integrated with the topics of Physics 1250 and are intended to be a solid foundation in Calculus applications for further courses in Engineering Technology.

Next are the ABET Criteria which is the Accrediting Board that validates Engineering & Engineering Technology programs are teaching you what you need to know. This course's goals and outcomes align with ABETs student outcomes as well as SME discipline specific outcomes as shown below.

ABET Student Outcomes - General Criteria	Course Goals	Course Outcomes
(1) an ability to apply knowledge, techniques, sills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problem appropriate to the discipline	*Apply appropriate mathematical tools to variety of scenarios in Engineering Technology*	1. Trigonometry, Vectors, Derivatives, Integrals, Optimization and Approximation
(2) an ability to design systems, components, or processes meeting specified needs for broadly defined engineering problems appropriate to the discipline	*Create, Manipulate and Interpret multiple representations of data*	1. Represent data in 2-D and in 3-D in graphical and function forms 2. Convert between different representations of data 3. Interpret relationships among variables given various representations in written and spoken form
(3) an ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature	*Demonstrate comfort with translating English description of a physical contexts into Math and back to English*	1. *Understand Mathematical notation in various contexts* 2. *Connect mathematical operations (derivatives, integrals, vectors, etc.) in real world applications* 3. *Communicate and explain mathematical concepts in complete English sentences*

(5) an ability to function effectively as a member as well as a leader on technical teams	*Work in groups to solve complicated problems and enhance communication skills.*	1. *Work independently on related portions of a project and synthesize results.* 2. *Communicate work using plain English sentences (presentations, progress reports).*
Discipline Specific - SME Outcomes		
(d) knowledge, skills, and abilities in statistics, quality, continuous improvement, and industrial organization and management	*Set up a model and use technology (Excel, Maple, etc.) where appropriate to simulate a system*	1. *Look at an unfamiliar situation, identify key concepts, appropriate formulas and make predictions.* 2. *Create a continuous model from a discrete set of data* 3. *Recognize relevant solutions to original problem.*

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[1] ABET (Accrediting Board of Engineering & Technology) evaluates student learning in 5 categories specifically for all 4-Year BSET programs known as the Student Outcomes (1-5). These are criteria they have determined are required to successfully work in the Engineering Technology field. Criteria (1),(2),(3) and (5) will be evaluated in this course.

Calculus I for Engineering Technology Math 1154

Textbook: Ximera online calculus texts at ximera.osu.edu. Additional course materials will be posted on Carmen

Course Outline

Week	In Class	Individual Assignment	Group Assignment
1	Intro Project Trig Review Algebra Review		
2	Lines Derivative/Integral Intuition Vectors, Parametrization		
3	Limits, Definition of Derivative Derivative Project		Derivative Project
4	Derivatives and graphs Definition of Definite Integral Integral Project		Integral Project
5	Review Exam 1 Polynomials		
6	Fundamental Thm. of Calculus Initial Value Problems Area Between Curves		Other project
7	Derivative Rules Trig Functions Circular Motion		
8	Harmonic Motion Logs and Exponentials Damped Oscillation		
9	Harmonic Motion Project Review Exam 2		Harmonic Motion Project
10	Substitution Volumes of Revolution Integrals for Phys. Quantities		
11	Integral Project Maxima and Minima Optimization		Integral Project(Volume, Center of Mass, Surface Area)
12	Excel Solver Linear Programming Least Squares		Linear Programming

13	Least Squares Project Review Exam 3		Least Squares Project
14	Other Topics Review		
15	EXAM Week		

Grading: Your course grade will be computed as follows:

Category	Points
Ximera Homework	260
Quizes/Explanations	150
Projects	140
Exam 1	100
Exam 2	100
Exam 3	100
Final	150
Total	1000

Final grades will be based on the approximate cut-off scores indicated below.

A	A-	B+	B	B-	C+	C	C-	D+	D
930	900	870	830	800	770	730	700	670	600

(Students will need a course grade of C– or better in Math 1154 in order to progress to the next class.)

Ximera Online Homework: This course uses the Carmen (http://www.carmen.osu.edu) course management system, in conjunction with the Ximera online homework system. Each assignment is listed in the Assignments tab. You should complete the homework assignment from each section as soon as possible after the class in which we cover the section. Due dates are shown on each assignment.

Calculus I for Engineering Technology Math 1154

Quizzes and Explanations: There will be many quizzes and explanations worth 5 points each. Any points beyond 150 will count as extra credit. They will be posted on Carmen, with due dates given on each quiz and on the calendar. It is recommended treat them as in-class quizzes, so that you are more prepared for the exams. Give yourself 20 to 30 minutes to solve the problems on a separate sheet of paper, without using notes. If you need to, finish the problems with extra time or with help from notes. Write your final answers with supporting work on the printed quiz forms from Carmen to turn in. **Explanations** are problems that also require a verbal explanation of the problem and the work done for a solution. Guidelines for creating and submitting these will be on Carmen.

Exams will be given during class time, except for the final.

Make-up Policy: Makeup quizzes and exams will only be permitted under the following conditions:

i)   You make arrangements with the instructor in advance, or
ii) you have documentation of a medical emergency or other University-excused absence.

Mental Health

As a student, you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, "feeling down", difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 1030 Lincoln Tower, 1800 Cannon Dr. 24-hour emergency help is also available through the National 24/7 Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org.

Disability Services

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.