CT212– STRENGTH OF MATERIALS

UNIVERSITY VISION

A leading University in advancing scholarly innovation, multi-cultural convergence, and responsive public service in a borderless Region.

UNIVERSITY MISSION

The University shall primarily provide advanced instruction and professional training in science and technology, agriculture, fisheries, education and other related fields of study. It shall also undertake research and extension services, and provide progressive leadership in its areas of specialization.

UNIVERSITY STRATEGIC GOALS

a. Deliver quality service to stakeholders to address current and future needs in instruction, research, extension, and production
b. Observe strict implementation of the laws as well as the policies and regulations of the University
c. Acquire with urgency state-of-the-art resources for its service areas
d. Bolster the relationship of the University with its local and international customers and partners
e. Leverage the qualifications and competences in personnel action and staffing
f. Evaluate the efficiency and responsiveness of the University systems and processes

INSTITUTIONAL OUTCOMES (IO)

a. Enhance competency development, commitment, professionalism, unity and true spirit of service for public accountability, transparency and delivery of quality services
b. Provide relevant programs and professional trainings that will respond to the development needs of the region
c. Strengthen local and international collaborations and partnerships for borderless programs
d. Develop a research culture among faculty and students
e. Develop and promote environmentally-sound and market-driven knowledge and technologies at par with international standards
f. Promote research-based information and technologies for sustainable development
g. Enhance resource generation and mobilization to sustain financial viability of the university

PROGRAM OUTCOMES (PO) COMMON TO ALL PROGRAMS AND ITS RELATIONSHIPS TO INSTITUTIONAL OUTCOMES

A graduate of Sultan Kudarat State University can:	INSTITUTIONAL OUTCOMES (IO)						
	a	b	c	d	e	f	g
a. articulate effectively and independently in multi-disciplinary and multi-cultural teams the latest development in the fields practiced such as Automotive, Architectural Drafting, Civil, Electrical, Electronics, Food and its allied discipline;	✓	✓		✓	✓	✓	✓
b. lead in the promotion and preservation of Filipino historical and cultural heritage, social empowerment and environmental sustainability in a professional and ethical approach;	✓	✓	✓	✓	✓	✓	✓
c. generate research-based information and technologies at par from international standards, and;	✓	✓	✓	✓	✓	✓	✓
d. promote and transfer knowledge and technologies for effective and efficient school-industry partnership.	✓	✓	✓	✓	✓	✓	✓

1	COURSE CODE	CT212
2	COURSE TITLE	Strength of Materials
3	PREREQUISITE	CT211
4	CREDITS	3 units

5 COURSE DESCRIPTION

Strength of Materials covers the fundamental concepts of stress, strain, deformation, and the mechanical behavior of materials under various loading conditions. Emphasis is placed on the analysis and design of structural members subjected to axial, torsional, bending, and combined loads.

6 COURSE LEARNING OUTCOMES (CLO) AND ITS RELATIONSHIPS TO PROGRAM OUTCOMES

At the end of the course, a student can:	Program Outcomes			
Course Learning Outcomes (CLO)	a	b	c	d
a. Analyze stresses and strains in materials under different loading conditions.	✓		✓	
b. Apply fundamental principles to determine deformations of structural members.	✓	✓		
c. Evaluate the safety and suitability of materials for engineering applications.		✓	✓	
d. Solve problems related to axial, torsional, and bending loads.	✓			✓
e. Communicate technical solutions and collaborate in engineering projects.				✓

7 COURSE CONTENTS

WEEK	CONTENT	INTENDED LEARNING OUTCOMES (ILOs)	TEACHING AND LEARNING ACTIVITIES (TLA)	OUTCOMES-BASED ASSESSMENT (OBA)	COURSE LEARNING OUTCOMES (CLOs)
1	Course Orientation *SKSU VMGO, Classroom Policies, Course Overview, Course Requirements, Grading System*	At the end of the orientation, the teacher can: a. discuss the University's VMGO, classroom policies, course overview, requirements and grading system	Discuss the VMGO of the University, the classroom policies, scope of the course, course requirements and grading system		
2-3	Introduction to Strength of Materials a. Concepts of Stress b. Concepts of Strain	At the end of the week, the learner can: a. Define stress, strain, and mechanical properties b. Explain Hooke's Law and material behavior c. Identify types of loads	a. Lecture b. Group discussion c. Problem-solving	a. Quiz b. Problem set	a

Week	Topic	Learning Outcomes	Teaching/Learning Activities	Assessment	
4-5	Axial Loading and Deformation	At the end of the week, the learner can: a. Solve problems on axial stress and strain b. Compute deformation in bars c. Analyze statically indeterminate problems	a. Lecture b. Problem-solving c. Peer instruction	a. Problem set b. Short quiz	a b d
6	Torsion of Circular Shafts	At the end of the week, the learner can: a. Explain torsional stress and angle of twist b. Analyze solid and hollow shafts c. Apply design criteria for torsion	a. Lecture b. Demonstration c. Hands-on activity	a. Problem set b. Practical quiz	a b c
7-8	Beams a. Shear b. Bending	At the end of the week, the learner can: a. Draw shear and moment diagrams b. Calculate maximum shear and bending moments c. Apply relationships between load, shear, and moment	a. Lecture b. Group work c. Drawing exercises	a. Quiz b. Problem set	a d
9-10	Stresses in Beams a. Flexural b. Shear	At the end of the week, the learner can: a. Compute normal and shear stresses in beams b. Apply flexure formula c. Analyze beam cross-sections	a. Lecture b. Problem-solving c. Peer review	a. Problem-set b. Quiz	a b d
11	**MIDTERM EXAMINATION**				
12	Combined Stresses	At the end of the week, the learner can: a. Analyze members under combined loading b. Apply superposition principle c. Solve design problems	a. Lecture b. Case study c. Group Activity	a. Problem set b. Case analysis	a d
13	Deflection of Beams	At the end of the week, the learner can: a. Explain methods for calculating deflection b. Use double integration and area-moment methods c. Interpret results for design	a. Lecture b. Problem-solving c. Demonstration	a. Problem set b. Quiz	a b d
14-15	Columns and Buckling	At the end of the week, the learner can: a. Explain buckling and critical load b. Apply Euler's formula c. Design columns for stability	a. Lecture b. Simulation c. Group work	a. Problem set b. Quiz	a c d
16-17	Material Selection and Failure Theories	At the end of the week, the learner can: a. Discuss material selection criteria b. Explain failure theories (e.g., maximum stress, strain energy) c. Evaluate safety factors	a. Lecture b. Case study	a. Case analysis b. Presentation	c e

18	
Total No. of Hours : 54	FINAL EXAMINATION

8 COURSE REQUIREMENTS AND COURSE POLICIES

COURSE REQUIREMENTS

Each student is required to:
1. attend and participate in all class sessions and activities;
2. complete all assigned problem sets, quizzes, and assignments;
3. pass the midterm and final examinations; and
4. adherence to automotive drafting standards and conventions

COURSE POLICIES

Attendance: A student will be marked late if he/she enters the class 5 minutes after start of class period. Any student who comes to class 15 minutes after the scheduled time or always late for three consecutive meetings shall be marked absent.

Missed work or exam: Any student who missed to submit a work assignment or to take a test should consult the concerned instructor for immediate compliance

Cheating and Plagiarism: Any student who committed any form of academic dishonesty (e.g., copy-paste plagiarism) shall be given disciplinary action provided in the SKSU Student's Handbook

Use of Technology: Cell phones should be turned off while the session is in progress. Using laptops, notebook PCs, smart phones, and tablets shall be allowed only when needed.

9 GRADING SYSTEM AND RUBRICS FOR GRADING

GRADING SYSTEM

Midterm Grade
Midterm Examination	40%
Attendance/ Class Participation	15%
Quizzes/Assignments	15%
Project (Report)	30%
TOTAL	100%

Final Term Grade
Final Term Examination	40%
Attendance/Class Participation	15%
Quizzes/Assignments	15%
Project	30%
TOTAL	100%

FINAL GRADE
Midterm Grade	50%
Final Term Grade	50%
TOTAL	100%

RUBRIC FOR PROJECT REPORTS

CRITERIA	5 – Excellent (100%)	4 – Very Good (90%)	3 – Satisfactory (80%)	2 – Needs Improvement (70%)	1 – Poor (60%)
ACCURACY	All calculations and analyses are correct; solutions are precise and error-free.	Minor computational or conceptual errors; overall solution is highly accurate.	Some errors in calculations or concepts, but main approach is correct.	Several errors in calculations or concepts; solution needs revision.	Major errors; solution is incorrect or does not address the problem.

4

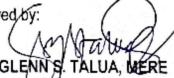| COMPLETENESS	All steps, explanations, and required elements are thoroughly presented and well-organized.	Missing 1 minor step or explanation; work is still clear and complete.	Missing 2–3 steps or explanations; work is generally understandable.	Several missing steps or explanations; work is incomplete.	Most steps/explanations missing; work is largely incomplete.
APPLICATION OF THEORY	Demonstrates excellent understanding and application of relevant principles, formulas, and concepts.	Applies most relevant principles and formulas correctly; minor misapplication.	Applies some relevant principles; some misapplication or misunderstanding.	Many principles/formulas misapplied or misunderstood.	Does not apply appropriate principles or formulas.
PRESENTATION & ORGANIZATION	Exceptionally clear, logical, and professional presentation; work is neat and easy to follow.	Mostly clear and well-organized; minor lapses in neatness or logic.	Adequate organization; some sections unclear or disorganized.	Disorganized or difficult to follow; several lapses in clarity or neatness.	Disorganized, unclear, and unprofessional presentation.
TIMELINESS	Submitted on or before deadline.	1 day late.	2 days late.	3 days late.	More than 3 days late.

References:
Textbooks

Beer, F. P., Johnston, E. R., DeWolf, J. T., & Mazurek, D. F. (2020). *Mechanics of Materials* (8th ed.). McGraw-Hill Education.
Hibbeler, R. C. (2022). *Mechanics of Materials* (11th ed.). Pearson.
Gere, J. M., & Goodno, B. J. (2018). *Mechanics of Materials* (9th ed.). Cengage Learning.
Philpot, T. A. (2019). *Mechanics of Materials: An Integrated Learning System* (4th ed.). Wiley

Prepared by:

JOSUE V. GUINSAN
Name of Faculty

Reviewed by:

GLENN S. TALUA, MERE
Program Chairperson /BindTech

2025 -08- 11

Approved by:

CHARLIE J. MAGHANOY, EdD
College Dean

5