



CCT 112 – REBAR WORKS AND STEEL WORKS

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 the BlinTech program can:	INSTITUTIONAL OUTCOMES (IO)						
	a	b	c	d	e	f	g
a. Analyze broadly defined industrial technology processes by using analytical tools that enhance creativity, innovativeness, and intellectual curiosity to improve methods, processes, and systems that meet the industry standards;	✓	✓				✓	
b. Design and implement broadly defined industrial systems, components, products, or processes to meet specific industry needs with proficiency and flexibility in the area of	✓	✓		✓		✓	

specialization in accordance with global standards;							
c. Apply appropriate techniques, resources, and state-of-the-art industrial technology tools to meet current industry needs and use these modern tools and processes to improve and increase entrepreneurial activities upholding the safety and health standards of business and industry;	✓		✓	✓	✓		
d. Communicate with diverse groups of clientele the appropriate cultural language with clarity and persuasion, in both oral and written forms, including understanding and giving of clear instructions, high comprehension level, effectiveness in delivering presentations and writing documents, and articulating technological innovation outputs;	✓	✓	✓	✓	✓		
e. Develop leadership and management skills in a team-based environment by making informed decisions, keeping the team motivated, acting and delegating responsibility, and inspiring positive changes in the organization by exercising responsibility with integrity and accountability in the practice of one's profession;	✓	✓	✓	✓	✓		
f. Practice the moral responsibilities of an industrial technologist to manage and balance wider public interest and uphold the norms and safety standards of the industrial technology profession;				✓	✓	✓	✓
g. Demonstrate enthusiasm and passion for continuous personal and professional development in broadly defined industrial technology and effecting positive changes in the entrepreneurial and industrial endeavor; and	✓	✓	✓	✓	✓	✓	✓
h. Recognize the need for, and an ability to engage in lifelong learning.	✓	✓	✓	✓	✓	✓	✓

1 COURSE CODE CT 112
2 COURSE TITLE REBAR WORKS
3 PREREQUISITE None
4 CREDITS 3 units

5 COURSE DESCRIPTION

This course introduces students to the fundamental principles and techniques involved in rebar (reinforcing bar) installation for concrete structures. Topics include the types and grades of rebar, proper placement, bending, tying, and anchoring methods, as well as safety practices and quality control measures. Through practical exercises and demonstrations, students will develop the skills necessary to accurately interpret reinforcement drawings, prepare rebar materials, and execute rebar works in accordance with industry standards and project specifications.

6 COURSE LEARNING OUTCOMES (CLO) AND ITS RELATIONSHIPS TO PROGRAM OUTCOMES	Course Learning Outcomes (CLO)	Program Outcomes							
		a	b	c	d	e	f	g	h
At the end of the course, a student can:									
a. Understand SKSU-VGMO, Classroom Policies, Course Overview, Course Requirements and Grading System;	✓	✓	✓	✓	✓	✓	✓	✓	✓
b. Understand the Types and Grades of Rebar	✓	✓	✓	✓	✓	✓	✓	✓	✓
c. Interpret Rebar Drawing and Specifications	✓	✓	✓	✓	✓	✓	✓	✓	✓
d. Calculate Rebar Quantities and Areas	✓	✓	✓	✓	✓	✓	✓	✓	✓
e. Apply Proper Rebar Placement and Spacing Techniques	✓	✓	✓	✓	✓	✓	✓	✓	✓

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 <i>SKSU VMGO, Classroom Policies, Course Overview, Course Requirements, Grading System</i>	At the end of the week, the student 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	a. Participation in discussions	abcdefg
2	Introduction to Rebar Works a.Overview of reinforced concrete structures b.Types of reinforcement bars c.Functions and importance of rebar in construction d.Materials used in rebar production e.Standards and codes governing rebar works (ACI, BS, Eurocode)	At the end of the week, the students can: a.Understand the fundamental concepts and components of reinforced concrete structures. b.Identify and differentiate between various types of reinforcement bars used in construction. c.Explain the role and significance of reinforcement bars in enhancing the strength and durability of concrete structures. d.Describe the materials and processes involved in producing reinforcement bars. e.Summarize the main international standards and codes that regulate rebar specifications and installation practices.	a.Lecture presentation on reinforced concrete principles. b.Hands-on examination of sample rebars. c.Group discussions on structural integrity. d.Video demonstration of rebar manufacturing processes. e.Review of key clauses related to rebar reinforcement.	a.Students will be able to describe the purpose and basic components of reinforced concrete structures. b.Ability to classify and specify different types of reinforcement bars. c.Students will articulate the functions of rebar and justify its importance in construction. d.Ability to list and explain materials used in rebar production. e.Apply knowledge to hypothetical or real project scenarios.	abcdefg
3	Rebar Design Principles a.Structural load considerations b.Reinforcement requirements for beams,	At the end of the week, the students can: a.Understand and evaluate the different types of structural loads acting on reinforced concrete elements b.Ensure reinforcement adequacy for strength and durability.	a.Calculations and design exercises for load assessment. b.Practical exercises on calculating reinforcement areas. c.Review of detailing standards and best practices. d.Theoretical sessions on codes and	a.Ability to identify and categorize various loads on structural elements. b.Accurate determination of reinforcement ratios and detailing for various elements. Ability to produce reinforcement	abcdefg

	<p>columns, slabs, and foundations</p> <p>c.Detailing for earthquake and wind resistance</p> <p>d.Splicing and development length</p> <p>e.Distribution and spacing of rebar</p>	<p>c.Comprehend the principles of seismic and wind detailing to enhance ductility and structural resilience.</p> <p>d.Understand the concepts of splicing and development length and their importance in rebar anchorage.</p> <p>e.Design reinforcement layouts that optimize structural performance.</p>	<p>formulas for development length.</p> <p>e.Design projects involving rebar layout planning.</p>	<p>schedules complying with standards.</p> <p>c.Ability to produce reinforcement details that conform to earthquake and wind resistance requirements.</p> <p>d.Competence in designing and detailing splices that ensure structural integrity.</p> <p>e.Ability to determine appropriate rebar spacing to meet structural and durability requirements.</p>	
4	<p>Rebar Detailing and Bar Bending Schedules</p> <p>a.Interpretation of structural drawings</p> <p>b.Creating rebar bending schedules</p> <p>c.Detailing reinforcement for different structural elements</p> <p>d.Use of software for rebar detailing (e.g., AutoCAD, RebarCAD)</p>	<p>At the end of the week, the students can:</p> <p>a.Understand the symbols, legends, and notation used in reinforcement drawings.</p> <p>b.Understand the importance of schedules in fabrication and construction efficiency.</p> <p>c.Design detailed reinforcement layouts for beams, columns, slabs, foundations, and other elements, considering structural and constructability requirements.</p> <p>d.Integrate software skills with traditional detailing practices to improve accuracy and efficiency.</p>	<p>a.Practice exercises analyzing sample drawings.</p> <p>b.Workshops on developing bar bending schedules from reinforcement drawings.</p> <p>c.Design exercises for reinforcement detailing of various elements.</p> <p>d.Practical exercises designing reinforcement layouts with software.</p>	<p>a.Proficiency in extracting reinforcement requirements from drawings.</p> <p>b.Ability to produce comprehensive and accurate bar bending schedules.</p> <p>c.Capability to produce clear, accurate reinforcement details suitable for construction.</p> <p>d.Demonstrated ability to produce detailed reinforcement drawings and schedules using relevant software.</p>	abcdefg
5	<p>Rebar Fabrication</p> <p>a. Cutting, bending, and marking rebar</p> <p>b.Fabrication shop practices</p> <p>c.Quality control during fabrication</p> <p>d.Rebar numbering and labeling</p>	<p>At the end of the week, the students can:</p> <p>a.Understand the techniques and tools used for cutting, bending, and marking rebar to meet structural specifications.</p> <p>b.Comprehend standard shop practices and safety procedures involved in rebar fabrication.</p> <p>c.Recognize the importance of quality control processes to ensure fabricated rebar meets design and safety standards.</p> <p>d.Understand the procedures for numbering and labeling rebar for</p>	<p>a.Demonstrations and hands-on practice in using cutting and bending machines.</p> <p>b.Lectures and discussions on shop safety, handling, and storage of rebar.</p> <p>c.Training on inspection techniques and quality assurance procedures.</p> <p>d.Demonstrations on rebar numbering and labeling methods.</p> <p>Practice exercises on labeling according to project specifications.</p>	<p>a.Ability to efficiently cut, bend, and mark rebar to specified dimensions.</p> <p>b.Ability to follow proper shop practices, ensuring quality and safety during fabrication.</p> <p>c.Ability to perform quality control inspections and document compliance with standards.</p> <p>d.Ability to accurately number and label rebar components, ensuring clear traceability throughout the construction process.</p>	abcdefg

		identification during fabrication and installation.			
6			MIDTERM EXAM		
7	Rebar numbering and labeling <ul style="list-style-type: none"> a. Site preparation and safety measures b. Laying and positioning of rebar c. Tying methods and tools d. Support and spacers for rebar e. Inspection and quality assurance during installation 	<p>At the end of the week, the students can:</p> <ul style="list-style-type: none"> a. Understand the importance of proper site preparation and safety protocols before rebar installation. b. Demonstrate proper techniques for laying out and positioning rebar according to drawings and specifications. c. Understand various tying methods and select appropriate tools for secure rebar fastening. d. Recognize the function and types of supports and spacers used to maintain rebar position and cover. e. Conduct inspections to verify correct rebar placement, tying, and support installation. 	<ul style="list-style-type: none"> a. Demonstrations and discussions on PPE, hazard identification, and safe handling of rebar. b. Review of reinforcement drawings and positioning guidelines. c. Demonstrations of different tying techniques (e.g., double loop, saddle tie). d. Demonstrations of various support and spacer types. e. Training on inspection techniques and checklists. 	<ul style="list-style-type: none"> a. Ability to implement safety measures effectively during rebar installation. b. Accurate and efficient placement of rebar, minimizing errors and ensuring compliance with design specifications. c. Ability to tie rebar securely and efficiently, ensuring structural stability and safety. d. Correctly position supports and spacers to ensure proper concrete coverage and reinforcement alignment. e. Ability to perform thorough inspections, identify non-conformities, and ensure quality compliance during rebar installation. 	abcdefg
8	Reinforcement Accessories and Supports <ul style="list-style-type: none"> a. Use of chairs, spacers, and couplers b. Anchorage and lap splicing techniques c. Corrosion protection measures 	<p>At the end of the week, the students can:</p> <ul style="list-style-type: none"> a. Demonstrate proper selection and placement of these accessories to ensure reinforcement positioning and structural integrity. b. Comprehend various anchorage and lap splicing methods used to connect reinforcement bars securely. c. Recognize the causes of reinforcement 	<ul style="list-style-type: none"> a. Lectures and presentations on different types of chairs, spacers, and couplers, including their functions and applications. b. Workshops and practical exercises demonstrating different anchorage and lap splicing methods (e.g., mechanical splices, lap splices). c. Demonstrations of applying 	<ul style="list-style-type: none"> a. Ability to correctly select and position reinforcement accessories to maintain proper rebar spacing and alignment, ensuring compliance with standards. b. Ability to perform proper anchorage and lap splicing, ensuring 	

		corrosion and understand various protection strategies.	protective coatings, galvanization, or use of corrosion-resistant materials.	reinforcement continuity and structural safety. c.Ability to select and apply appropriate corrosion protection measures, enhancing the longevity of reinforced concrete structures.	
9	Safety and Quality Standards a.Safety protocols on site b.Inspection and testing of rebar work c.Common defects and troubleshooting d.Documentation and reporting	At the end of the week, the students can: a.Understand essential safety protocols and practices to ensure a safe working environment during rebar installation. b.Comprehend the importance of inspection and testing procedures to ensure rebar work meets quality standards. c.Recognize common defects in rebar installation such as misalignment, insufficient ties, corrosion, or inadequate cover. d.Understand the importance of accurate documentation and reporting for quality control and project records.	a.Lectures and discussions on site safety standards, PPE requirements, hazard identification, and emergency procedures. b.Demonstrations of testing methods such as tensile tests, bend tests, and cover measurements. c.Group exercises on diagnosing issues and proposing corrective actions. d.Review of sample reports and discussion on reporting best practices.	a.Ability to consistently follow safety protocols, reducing accidents and creating a safe work environment. b.Ability to conduct thorough inspections and tests, ensuring rebar work complies with project specifications and standards. c.Ability to identify defects promptly and implement effective corrective measures, maintaining quality standards. d.Ability to produce clear, accurate, and comprehensive documentation, supporting quality assurance and compliance.	
10	Case Studies and Practical Sessions a.Real-world rebar detailing and installation scenarios b.Hands-on practice with rebar bending and tying c.Reading and interpreting reinforcement drawings	At the end of the week, the students can: a.Analyze real-world rebar detailing and installation challenges to understand practical applications and solutions. b.Develop skills in manual rebar bending, cutting, and tying to ensure proper reinforcement placement. c.Understand reinforcement drawings and specifications to accurately interpret rebar layouts and details.	a.Group discussions analyzing causes of issues and proposing solutions. b.Practical sessions where students practice bending, cutting, and tying rebar under supervision. c.Workshops on reading and interpreting reinforcement drawings, including symbols, scales, and notes.	a.Ability to evaluate and adapt rebar detailing and installation practices based on real-world scenarios, improving project outcomes. b.Ability to perform rebar bending and tying efficiently and accurately, ensuring reinforcement is securely placed as per standards. c.Ability to accurately interpret reinforcement drawings and implement the specified details during rebar installation, minimizing errors.	

Total No. of Hours : 54

8 COURSE REQUIREMENTS AND COURSE POLICIES**COURSE REQUIREMENTS**
Each student is required to:

1. submit accomplished assignments, and activities;
2. make a PowerPoint presentation, and a written summary of the assigned report;
3. participate actively in all discussion;
4. discuss an assigned topic to report and participate in class discussions; and
5. pass the major exams (midterm and final)

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. A scientific calculator (e.g. Casio fx-991ES) shall be utilized in solving.

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%

Materials used: Laptop, Powerpoint presentations and video clips
Books, Magazines, Online slides, Teacher-made slides

References:
Textbooks

- Neville, A. M. (2012). Properties of Concrete (5th ed.). Pearson Education.
Gajda, J., & Szymczak, S. (2018). Structural Steel Design: A Practice-Oriented Approach. Springer.
MacGregor, J. G., & Wight, J. K. (2012). Reinforced Concrete: Mechanics and Design (6th ed.). Pearson.
Hendrickson, C., & Koerner, R. M. (2010). Reinforced Concrete Design. McGraw-Hill.

Online

- The Constructor. (2020). Reinforced Concrete Design Principles. Retrieved from <https://theconstructor.org/>
RebarCAD Software. (n.d.). Rebar Detailing Software. Retrieved from <https://www.rebarcad.com/>
Standards and codes governing rebar works. Available at:
<https://www.concrete.org/publications/internationalconcreteabstractsportals/more.aspx?m=50550569>

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