Table 1 Theory and Design of Structure – II (Strength of Materials)

Addis Ababa Science and Technology University														
1	College: Architecture and Civil Engineering								Department: Architecture					
2	Course Category	Core Course												
	Course Name	Theory and Design of Structure – II (Strength of Materials)												
	Course Code:	ARCH2110												
3	Synopsis:	This course provides an introduction to the analysis of determinate and indeterminate structure. This knowledge is very essential for an engineer to enable him in designing all types of structures.												
4	Name(s) of Academic Staff:	Helen Negash and Yohannes Gudeta												
5	Semester and Year offered:	Semester:	II	Year:	2									
6	Credit Hour:	3												
7	Prerequisite/ Co-requisite: (if any)	ARCH2109 Theory and Design Of Structure – I (Engineering Mechanics)												

8	Course Learning Outcome (CLO): At the end of the course the student will be able to do:	
	CLO1	Compute the static determinacy and stability of structures.
	CLO2	Develop the shear force and bending moment diagrams for determinate beams.
	CLO3	Compute the deflection for beams.
	CLO4	Design the size of compression member subjected to critical load.
	CLO5	Develop the shear force and bending moment diagrams for indeterminate beams.
	CLO6	Compute the radial thrust and maximum bending moment for arch.

9 Mapping of the course Learning Outcomes to the Student Performance Criteria (SPC), Teaching Methods and Assessment:

Course Learning Outcomes (CLO)	Student Performance Criteria (SPC)				Teaching Methods				Assessment				
	Realm A	Realm B	Realm C	Realm D	L	T	P	O	Test	Quiz	Assignment	Project	Lab-report
CLO1	A3				√	√			√	√	√		
CLO2	A3,A8	B4		D1	√	√			√	√	√		
CLO3	A8				√	√			√	√	√		

	CLO4	A3,A5	B3	C1	D3	√	√			√	√	√		
	CLO5	A5		C1		√	√			√	√	√		
	CLO6		B1			√	√			√	√	√		
	Indicate the relevancy between the CLO and SPC by ticking "√"on the appropriate relevant box													

10	Transferable Skills (if applicable) (Skills learned in the course of study which can be useful and utilized in other settings)	
	1	To enable a student to understand the basic concepts of shear force and bending moment acting on beams subjected to various loading conditions through exercises.

11 Distribution of Student Learning Time (SLT)

Course Content Outline	CLO	Teaching and Learning Activities						Total (SLT)hr
		Guided learning (F2F) (hr)				Guided Learning (NF2F) (hr)	Independent Learning (NF2F) (hr)	
		L	T	P	O			
Chapter 1: Introduction to Strength of Materials: Structural Loads and Systems 1.1 Loads on Structures 1.2 Static determinacy and Stability of Structures 1.3 Determinacy of Structures-Trusses, Beams and Frames 1.4 Introduction to structural System	1	3	5			6		14
Chapter 2: Analysis of Determinate Beams 2.1 Beams, Types of Supports, Types of Load 2.2 Analysis of simply supported trusses by method of joints 2.3 Shear Force, Bending	2	3	5			6		14

	Moment Diagram for Simply Supported, Cantilever and Over Hanging Beams 2.4 Theory of simple bending. Stress distribution at a cross section due to bending moment and shear for Rectangular, I and T sections.								
	Chapter 3: Deflection of Beams 3.1 Deflection of determinate beams 3.2 Slope and Deflection using Double Integration Method 3.3 Moment Area Method	3	9	10			10		29
	Chapter 4: COLUMNS 4.1 Introduction, Failure of Column, Critical Load 4.2 Euler's Column Theory – End Conditions of Column 4.3 Expression for Critical Load with different end Condition of Column 4.4 Effective Length of Column 4.5 Rankine's formula for Column	4	1	2			2		
	Chapter 5: Analysis of Indeterminate Beams 5.1 Propped Cantilever beam 5.2 Fixed Beams-Fixed end Moments and Reactions 5.3 Theorem of Three Moments 5.4 Analysis of Continuous Beams, Shear Force and Bending Moment Diagrams for Continuous Beams.	5	5	5			4		14

	Chapter 6: Analysis of Arches 6.1 Arches as Structural Forms, Types of arches 6.2 Arches as Structural Forms 6.3 Analysis of Three Hinged, Parabolic Arches 6.4 Analysis of Three Hinged, Circular Arches	6	3	8			6		17
	Total		30	44			36		107

Assessment					
Continuous Assessment		Percentage Total-50(%)	F2F(hr)	NF2F(hr)	SLT(hr)
1	Quize	10	1	0	
2	Tests	20	2	0	
3	Assignments	20	0	3	
4	Choose an item.				
5	Choose an item.				
Total					6

Final Exam	Percentage 50 (%)	F2F(hr)	NF2F(hr)	SLT(hr)
Final Exam	50	3	3	6
Grand Total SLT				120

L = Lecture, T = Tutorial, P = Practical, O = Others, F2F = Face to Face, NF2F = Non Face to Face

Note: indicates the CLO based on the CLO's numbering in item 9.

12	Special requirements and resources to deliver the course (e.g. software, computer lab, simulation room …etc.)	1	Choose an item.
		2	Choose an item.
		3	Choose an item.
		4	Choose an item.
		5	Choose an item.

13	Text book	1	R.K. Bansal ;A (2018),Textbook of Strength of Materials, Laxmi Publications,
	and reference: (note: ensure the latest edition /publication)	2	Barry S Onouye ; (2015), Statics and Strength of Materials for Architecture and Building Construction, Pearson Education,
		3	T. D. Gunneswara Rao ,Mudimby Andal ; (2018), Strength of Materials:Fundamentalsand Applications Paperback, Cambridge University Press ,
		4	Leet, Uang, et al , (2017), Fundamentals of Structural Analysis, McGraw Hill Education ,
		5	Barry S Onouye; (2015), Statics and Strength of Materials for Architecture and Building Construction, Pearson Education,