Course Outline

Arch 3104: Building Materials and Constructions

Part A

1	Course Code	Arch 3104
2	Course Title	Building Materials and Constructions
3	Course Type	Core Course
4	Year/Semester	3rd/Odd
5	Academic Session	
6	Course Instructor	Nazia Afrin Trina, Md. Nazmul Hoda
7	Prerequisite (If any)	N/A
8	Credit Value	3.00
9	Contact Hours	6.00
10	Total Marks	100
11	Rationale of the Course	This course provides a comprehensive understanding of the fundamental materials and components used in building construction, including cement, sand, concrete, stone, brick, timber, steel, and traditional materials. Students will learn to represent these components through relevant drawings and conduct simple tests for building materials. The course covers various construction methods and systems, including the use of Reinforced Cement Concrete (RCC) and composite works. It also delves into the implications of using different finish materials like wood, glass, paints, and prefabricated materials. Special forms of construction like domes, vaults, shells, space frames, and metal structures are also covered. Site visits form an integral part of the course to familiarize students with construction techniques and site supervision.
12	Course Objectives	 Develop a knowledge of the most commonly used building and finish materials available in the building industry both locally and globally Equip students with an understanding of how different materials are sourced and/or manufactured to make them convenient for construction work and maintenance

		3.	Create an account of the life cycle of building materials to compare the outcome of using different types of materials in terms of environmental impact and sustainability Develop knowledge of the suitability of different materials as required by professional design practices in terms of construction, maintenance, aesthetics, and cost.
	Course Learning	After c	completing this course students will be able to
	Outcomes (CLOs)	1.	Demonstrate knowledge of different types of factory-produced and locally sourced building and finish materials that are most commonly used in the building industry.
		2.	Discuss the uses, manufacturing process, and methods of usage of various types of building materials in building construction.
		3.	Apply the knowledge of different uses of a single material and how different types of materials work together to integrate the design and construction process that satisfies the regulations practiced by professionals in a given context.
		4.	Demonstrate the ability to compare different types of building materials in terms of their carbon footprint in construction projects through life cycle analysis to ensure informed decision-making during the design phase.

Mapping/Alignment of CLO with Program Learning Outcomes (PLOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PL0 11	PL0 12
	Knowle dge	Critical awaren ess and analysi s	Design synthes is and buildin g integrat ion	Technic al aptitud e	Present ation and commu nicatio n	Advanc e technol ogical skill	Society, environ ment and sustain ability	Ethical principl es and regulat ory context	Higher educati on and scholar ly qualitie s	Individu al and team work	Manag ement and project econo mics	Lifelon g learnin g
CLO 1	1		1									
CLO 2	1	1	1	1								
CLO 3		1	1	1								
CLO 4	1		1	1			1					

Part B

14. Course Plan specifying content, CLOs, co-curricular activities (if any), teaching-learning, and assessment strategy mapped with CLOs.

Understanding the basic materials and components of a building with its production details, such as cement, sand, concrete, stone, brick, timber, steel, rural and traditional materials, etc. and to enable them to represent the different building components through relevant drawings. Simple tests for building materials and ingredients; preparation of concrete mix, placing, and curing. Concrete construction methods: special concrete and concreting methods, cement & concrete. A comprehensive study of the building construction and systems, materials, and methods, and their implications, such as foundation, footing (stone, brick & RCC); Wall section (plinth, floor, sill, lintel, roof & parapet); Roofs (flat, sloped, pyramid & dome); brick masonry, roofs in traditional material, structures using rural materials. Submission of a model showing details of any structural system using R.C.C works/composite works, the finish materials of a building with its manufacturing details such as wood, glass, paints, partitions & shelves & drop ceiling, thermal insulation, and acoustics insulation, pre-fabricated materials, lifts, escalators & conveyors, ferrous metals, steel trusses frames, gates, and steel components, aluminum, plastics, damp proofing, and waterproofing. A comprehensive study of the building construction methods of finish materials and their implications such as fenestration (different types of doors, windows, grill, louver & ventilators), kitchen, toilet, plumbing, electrical, etc. Constructions of special form dome, vault, shell, space frame, metal structure, etc. Site visits to acquaint with construction techniques and site supervision with proper documentation.

WEEK	TOPIC	TEACHING LEARNING STRATEGY	ASSESSMENT STRATEGY	CORRESPONDIN G CLOs
1	Study on basic materials and components of a building	ID, LDM	Presentation	CLO 1
2	Applying basic materials and components of a building studies through basic design	ID, HD		CLO 1,2
3	Applying basic materials and components of a building studies through basic design	ID, HD	Preliminary	CLO 1,2
4	Project 01	ID, HD		CLO 1,2,3
5	Project 01	ID, HD, LDM	Preliminary	CLO 1,2,3
6	Project 01	ID, HD		CLO 1,2,3
7	Project 01	ID, HD	Submission	CLO 1,2,3
8	Project 02	ID, HD, LDM	Presentation	CLO 1,2,3,4

WEEK	TOPIC	TEACHING LEARNING STRATEGY	ASSESSMENT STRATEGY	CORRESPONDIN G CLOs
9	Project 02	ID, HD, LDM		CLO 1,2,3,4
10	Project 02	ID, HD, LDM	Report	CLO 1,2,3,4
11	Project 02	ID, HD, LDM	Presentation	CLO 1,2,3,4
12	Project 02	ID, HD	Presentation	CLO 1,2,3,4
13	Portfolio submission	ID, HD, PD	Board Viva	CLO 1,2,3,4

Part C

15	ASSESSMENT AND EVALUATION	ASSESSMENT STRATEGY CLASS TEST:
		A total of 4 class tests will be taken during the semester, 2 for each part (part A and part B). The marks of these class tests will be counted in 20. At the end of the semester, the average mark of 3 of these class tests will count for the final grade. Marks from the class test with the highest marks for each student will be counted.
		STUDENT PRESENTATION
		Students will be required to study a topic and present it to the entire class at various points during the semester. These presentations can be done in groups or individually, depending on the requirement of the assigned topic. The presentation may make use of audio-visual learning tools. Course teachers will accommodate the marks to be counted besides class test marks.
		ASSIGNMENT
		Apart from class tests and presentations, course teachers may assign additional assignments to benefit the students during the semester. Course teachers will accommodate the marks to be counted besides class test marks. SEMESTER FINAL
		At the end of the semester, a semester final exam will take place. The total mark of this exam is 60 for both parts, meaning each part (part A and part B) will hold 30 marks.
		MARKS DISTRIBUTION The mark from class attendance, Class tests/ presentation/ assignment/ and semester final will be added to calculate the entire

course marks for each student. The details of the strategy can be found in the following table of CIE - Continuous Internal Evaluation provided to each student.
Final Marks (100) = Class Participation and Attendance (10) + Class Test (20) + Assignment/ Project/ Viva-voce/ Presentation/others (10) + Semester Final Examination (60)
MAKE-UP PROCEDURES Assignment

CIE- CONTINUOUS INTERNAL EVALUATION (40 MARKS)

BLOOM'S CATEGORY	CLASS TEST (20 MARKS)	ASSIGNMENT/ PROJECT/ VIVA-VOCE/ PRESENTATION/ OTHERS (10 MARKS)	CLASS PARTICIPATION AND ATTENDANCE (10 MARKS)
Remember	2		
Understand	2		
Apply	5		10
Analyze	4	3	
Evaluate	4	2	
Create	3	5	

SMEE-SEMESTER/YEAR MID & END EXAMINATION (60 MARKS)

BLOOM'S CATEGORY	TEST MARK
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

Part D

16		RECOMMENDED READINGS
	LEARNING MATERIALS	 Aziz, M. A. (1995) Engineering materials, Z and Z Computer and Printers, Dhaka: Bangladesh. Allen, E. & Iano, J. 2019.Fundamentals of building construction: materials and methods. John Wiley & Sons. Smith, R. C., &Andres, C. K. (1988) Materials of Construction, 4 Sub editions, Glencoe/McGraw-Hill. Kumar, S. (2006) Building Construction, Standard Publishers Distributors. Ching, F. D. (2020) Building Construction Illustrated, 4th edition, New Jersey: John Wiley and Sons Inc. Chudley, R. and Greeno, R. 2006. Building construction handbook. Routledge.
		SUPPLEMENTARY READINGS
		 Fregonara, E., Giordano, R., Rolando, D., & Tulliani, J.M. (2016). Integrating environmental and economic sustainability in new building construction and retrofits. Journal of Urban Technology, 23(4), pp.3-28. Dong, Y.H., & Ng, S.T. (2016). A modeling framework to evaluate the sustainability of building construction based on LCSA. The International Journal of Life Cycle Assessment, 21(4), 555-568. Vanegas, J.A., DuBose, J.R., & Pearce, A.R. (1996, November). Sustainable technologies for the building construction industry. In Proceedings, Symposium on Design for the Global Environment, Atlanta, GA. Purina, B. C., Building construction. Singh, A., Berghorn, G., Joshi, S., & Syal, M., (2010). Review of life-cycle assessment applications in building construction. Journal of Architectural Engineering, 17(1), 15-23.
		OTHERS N/A