University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Architectural Engineering and Environmental Design

Form no. (12): **Course Specification**

1- Course Data

Course Code: **AR 251**	Course Title: **Building Technology 1**			Academic Year/Level: **2nd** year / **3rd** semester
Specialization: **Architecture**	No. of Instructional Units			Prerequisite
	Credit **3**	Lecture **2**	Tutorial **4**	**None**

2- Course Aim

The course introduces the student to the **principles and fundamentals** of building construction. Topics include the basic concepts of structural systems and foundations according to building loads and soil characteristics. In addition, the course presents the basic units of wall construction systems and clarifies the different methods of building insulation.

The course aims to:

- Teach students the main principles and fundamentals of building construction.
- Enhance the student with practical skills for preparing technical and professional working drawings using engineering tools.
- Produce graduates equipped to solve basic construction problems.

3- Intended Learning Outcomes

a- Knowledge and Understanding	**Through knowledge and understanding, students will be able to:** • Define basic structural systems and their components. • Define main foundation systems and types of wall units - bricks & blocks - and their various bonding types. • List different insulation methods and materials. • Classify symbols and codes of different building materials. • Define Arabic & English construction & site terminologies.
b- Intellectual Skills	**Through intellectual skills, students will be able to:** • Design suitable working and execution drawings for structural and foundation • Solve technical problems related to wall units, insulation materials and their joints. • Differentiate between construction systems & their materials.
c- Professional Skills	**Through professional and practical skills, students will be able to:** • Prepare technical and professional drawings using engineering tools. • Select and apply structural foundation systems, masonry work and insulation. • Gather and co-ordinate construction elements as one integrated whole system.
d- General Skills	**Through general and transferable skills, students will be able to:** • Present and discuss construction problems and items in an appropriate professional manner. • Communicate ideas effectively in writing, as well as verbally and visually (through drawings). • Independently seek knowledge, set aims, targets, objectives and plan to meet them with a deadline (time management). • Transfer techniques and solutions from one field of architecture to another.

4- Course Content

Week No.1	Introduction to building construction: Building construction and building technology, building design and implementation process and the role of architects in building design and construction. The course contents, structural systems, foundation systems, masonry work and insulation in buildings.
Week No.2	Building construction & structural systems: (bearing walls, skeleton, large span structures… etc). Identification of building technology (concepts, applications…), building construction and structural systems. Classification of main structure systems (short, medium and large span structures). Load types and lateral forces in buildings, and the strength of materials. Load bearing wall structural system (load transfer, structural system components and constraints).
Week No.3	Skeleton structure system (load transfer, structural system components, constraints,& site terminologies. Frame structure system concept & components.
Week No.4	Large span structure (frames, trusses, space trusses, folded plates, shell, pneumatic, tensile and cable & membrane structures) and the role of technology in the construction process. High rise structure systems: Core and bundle of tubes systems.
Week No.5	Foundation types: Shallow and deep foundations (strip, isolated, raft, piles…). Soil report (soil test, soil classification and stress, underground water level and report recommendations). Strip foundation types.
Week No.6	Isolated and combined footings' components (column, reinforced concrete base, plain concrete base and underground beam types).
Week No.7	Continuation of the previous lecture and evaluation.
Week No.8	Raft & Pile foundation systems components.
Week No.9	Presentation of research (1).
Week No.10	Masonry Work: Brick and block types (red brick, cement block…) Special bricks & blocks (light brick & block, glass brick….). Brick and block bonds (running bond, English bond).
Week No.11	Lintel and parapet in wall construction.
Week No.12	Continuation of the previous lecture and evaluation.
Week No.13	Building insulation types: Water, moisture, heat insulation concepts and types (roof & bathroom in types).
Week No.14	Building insulation: Water and moisture insulation (ground and basement floors). Retaining walls.
Week No.15	Presentation of research (2) & project submission. General revision

5- Teaching and Learning Methods

The course comprises a combination of:
Lectures, studio work and research assignments. Studio work includes drawing exercises, studio project work, and discussion sessions.

6-Teaching and Learning Methods for Students with Special Needs

- Consulting with lecturer during office hours.
- Consulting with teaching assistant during office hours.
- Private sessions for redelivering the lecture contents.
- For handicapped accessibility, please refer to program specification.

7- Student Assessment

Asses No.	Procedures used		Start Week No.	Subm. Week No.	Weighting of Asses.
	Type	To assess			
1	work (1): Structure systems (Bearing walls, Skeleton system, Spatial and Suspended Structures) and Foundation Types (Shallow & Deep)	Knowledge and transferable skills	2	8,9	%
2	work (2): Types of bricks and blocks & insulation materials	Knowledge and transferable skills	2	8,15	5%
3	.	All skills	2	15	#5%
4	(1): Building materials codes in A external wall section	Knowledge and understanding	1	2	%
5	(2): Bearing wall structure system	Knowledge and understanding	2	2	%
6	(3): Skeleton structure system, plan & section for simple space.	Knowledge and understanding	3	3	%
7	(4): Large span structure system: Space truss (plan & section)	Knowledge and understanding	4	4	%
8	(5): Strip foundation (plans, Sections)	Knowledge and understanding	5	5	%
9	(6): Isolated foundations (plans, Sections).	Knowledge and understanding	6	6	#10%
10		Knowledge and intellectual skills Practical skills	7	7	20%
11	s (7): Raft and pile footings (Plans, Sections)	Knowledge and understanding	8	8	%
12	s (8): Brick and Block types	Knowledge and understanding	10	10	%
13	(9): Brick bonds (application on English bond)	Knowledge and understanding	11	11	%
14	(10): Building Insulation (heat, water and moisture), for roof & bathroom.	Knowledge and understanding	13	13	%
15	s (11): Building Insulation (water & moisture), for ground & basement floors.	Knowledge and understanding	14	14	%
16	Drawing exam.	Knowledge and intellectual skills Practical skills	12	12	#10%
17	Drawing exam.	Knowledge and intellectual skills Practical skills	16	16	40%
Total					100%

8- List of References:

a- Course Notes	Notes are handed out to the student throughout the semester.
b- Required Books (Textbooks)	• SEELY, I.H. - *Building Technology*- Mac Millan - London - 1995.
c- Recommended Books	• BARRY, R.*,The Construction of Buildings*, (Vol. I, IV) Ed., Granada Technical Books, London, 1980. • CHING, F., Building Construction Illustration, John Wiley, New York, 1991. • CHUDLEY, R., *Construction Technology*, 2nd Ed., Essex, England: Longman, 1987. • GREENO, Roger, *Principles of Construction*.- 2nd Ed., Essex: Longman, 1986. • LYONS, Arthur, *Materials for architects and Builders*, Oxford: Elsevier, 2007. • MCKAY, W.B., Building Construction, (Vol. 1) last Ed., Longman, London. • MC ROVEN, Ch., Building with Stone, Lippincott & Crowell Publishers, New York-1980. • NASHED, Fred, Time – Saver Details for Exterior wall Design, N.Y.:Mcgraw-Hill,1996. • NIKOLAS, Davies & JOKINIEMI, Erkki, *Dictionary of Architecture and Building construction*, 1st Edition. 2008. • OSBOURN, D., Introduction to Building, England: Wesley,1997. • ROSEN, Harold J, Architectural Materials for Construction, N.Y.: Mcgraw – Hill, 1996. • ROY, Chudley & GREENO, Roger.BA, Advanced construction Technology,3rd Edition, 2005
d- Periodicals, Web Sites, etc.	N/A