

Department : Building & Construction Technology Engineering

Subject: Estimation, Specifications and Contracts

Class: Fourth year

Hours: 2 hrs (Theoretical), 2 hrs (Practical)

Objectives:

The student will be able to make approximate and detailed estimates of buildings, specify the proper method of measurement, do the rate analysis for different items of works. He will also be able to write the technical specifications for various civil engineering works. Finally, he will get thorough knowledge on the types of contracts and the general and special conditions related to them.

Week	Syllabus
1&2	Introduction: engineering projects & estimation, definition of estimation, benefits of estimation, factors affecting cost estimation, types of estimation, practical examples on approximate estimation.
3	General rules in quantitative survey: Principles in selecting units of measurement for items, various units and modes of measurement for different items of works, details of quantities measuring.
4	rate analysis, factors affecting the cost of materials and labour, Plants and equipment -hour costs based on total costs and Outputs, Overhead charges, rates for various items of construction of civil engineering works, problems and examples on rate analysis
5&6	Methods of working quantities for various items of works, Measurement and abstract sheets and recording, excavation and fill works for wall footings, estimation of walls and other items of buildings up to D. P. C. level, methods used to calculate the length of various works: method of strips and center lines method, examples and problems.
7&8	Earthworks for various engineering projects: irrigation channels, roadway embankments, methods used for calculating earthwork quantities and volumes, Mass diagrams, calculations of excavation volumes due to cut works (grid leveling method and triangular method), examples and problems.
9	Estimation of masonry works, basic units and materials used, Estimation of walls construction, damp proofing used, brick works, block works, stone works, examples and problems

10&11	Estimation of concrete works, primary materials used, mixing of concrete materials, types of concrete mixers, calculating quantities of concrete materials, examples and problems
12&13	Estimation of concrete works quantities for spread and combined footings
14	Estimation of concrete works quantities for lintels, beams, roofs, columns and stairs
15	Estimation of form works quantities for lintels, beams, roofs, tie beams, columns and arches
16&17	Reinforcement calculations for beams, roofs, columns and footings, specifications
18&19	Finishing works: types, estimation of outside and inside finishing works, plastering, painting, brick and stone coating, glass works, specifications
20	Estimation of tiles works: tiles, mosaic, ceramic, porcelain, ... etc, specifications
21	Estimation of sanitary, sewage, plumbing and electrical works
22	Estimation of materials used in flexible and rigid pavements, estimation of curbstones used in curbs
23	Estimation of materials used in industrial sheds and steel buildings, columns and base plates, beams and bearing plates, connections, floors and roofs.
24	Machines and equipment used in executing various works, Cost of owning and operating construction machines; depreciation, investment and operational costs. Profits, payment and indirect project costs.
25&26	Technical specifications: definition, scope, resources and types of specifications, role of specifications in engineering project quality and estimated cost, technical specifications for various works.
27	Computer-aided estimation, Using spread sheet applications and other software packages in estimation
28	Valuation: Principles, purpose and function of valuation, Factors affecting the valuation of properties, Valuer and his duties.
29&30	Contracts: definition, types of contracts, Identification of rules, standards, related to the contracts of civil engineering works and related items, general and special conditions for civil engineering works.

References:

1. تخمين ومواصفات الأعمال الإنشائية، المهندس غانم عبد الرحمن بكر.
2. التخمين ومواصفات، مدحت فضيل فتح الله.
3. شروط المقاولات لأعمال الهندسة المدنية بقسميها الأول والثاني، وزارة التخطيط والتعاون الإنمائي، 2005.
4. المواصفات الفنية العامة، المكتب الاستشاري في معهد التكنولوجيا/بغداد ، طبعة أولى ، 1982.
5. Construction, Planning & Technology, Rajiv Gupta, 1984.
6. Construction, Planning Equipment & Methods, R.L. Peurifoy et al, 7th ed., 2006.
7. General technical conditions and specifications, book -1 / 2, specification of materials workmanship of civil engineering works, 2nd ed., 2002.
8. Building construction handbook, R. Chudley and R. Greeno, 5th ed., Elsevier Butterworth-Heinemann, 2004.
9. Practical Standard Methods of Measurement Cost Estimating in the Design Stage, Hong-Kong, 2001,.
10. The civil engineering handbook / edited by W.F. Chen and J.Y. Richard Liew, 2nd ed., by CRC press LLC, Ch. 1, Construction, 2003.