Module (Course Syllabus) Catalogue

2020-2021

College/ Institute	Erbil Technology College	
Department	Road Construction Department	
Module Name	Quantity Surveying	
Module Code	QUS304	
Degree	Technical Diploma [*] Bachelor [ ] High Diploma [ ] Master [ ] PhD [ ]	
Semester	3	
Qualification		
Scientific Title	Quantitative Survey - Estimation	
ECTS (Credits)		
Module type	Prerequisite [ ] Core [*] Assist. [ ]	
Weekly hours		
Weekly hours (Theory)	(1)hr Class	(46)Total hrs Workload
Weekly hours (Practical)	(2)hr Class	(89)Total hrs Workload
Number of Weeks	16	
Lecturer (Theory)	Saud Ahmed Hussein	
E-Mail & Mobile NO.	Saud.hussein@epu.edu.iq	
Lecturer (Practical)	Saud Ahmed Hussein	
E-Mail & Mobile NO.	Saud.hussein@epu.edu.iq	
Websites		

Course Book

Course Description	- **Course overview:** Official Course language is: English language Course weekly hours: 3 hours (1 theoretical + 2 Practical) Subject: Quantity Survey and Estimation Theoretical hours of this course are focuses on : measurement, estimating, assessing , evaluating , valuating , documentation, commercial aspects, costing, , planning management, contract administration, contract law, economics and financial aspects. Practical hours of the course are focuses on : (also to above subjects) the course focuses on subjects that are essential in the construction industry. These are: Building Drawing and Design , Construction Technology , Building/Construction Materials , Building Services Engineering , Facility Management , Construction/Site Surveying , Engineering Mathematics and Statistics , Civil Engineering Technology , Civil Engineering Measurement
Course objectives	- **Course objective:** - The aim of the study of this course to enable the students to work after graduation according to scientific approach also aims to achieve the following objectives: 1 – Good knowledge and inclusive information about the type and sector/class of the project (works) that he estimates whether it (residential houses , road projects , apartments , commercial buildings , irrigation projects , …… etc.) .

	2 – A clear ability of understanding and practiced to the specifications , standards and engineering conditions and have good instructions about the set of designs and plans of all work items of the project . 3 – Accurate and complete information about the (prices , rates , costs , charges , wages and salaries) and kinds of the all primary (initially) construction/building materials and all their requirements , in addition to that he should have wide information about the necessary needed equipment and machineries and their (availability , usage , utilizing) . 4 – Be precise in measurements and calculations to estimate all measurements of the engineering work items for preparing and arranging primary/initially bill of quantities and the performed/actually bill of quantities of the project . 5 – Practical and field experience to implement and performing the project exactly accordance to the specifications and engineering conditions and the set of (designs , drawings and plans) . 6 – Able to arrange and to follow in succession of the interlaced or overlapped work items in the bill of quantities with scheduling them uniformly in the timetable of the project . 7 – Well able to estimate the (needed times , periods , durations and time consuming and appointing) for implementing of the engineering work items of the project , in order to preparing and drawing a typical (timetable or schedule progress of the work) .

	8 – Expert and have a good capability to manage/administrate the projects in the all implementing stages/phases in most matters especially in the technical affairs to be aware to find the best solutions and to optimize for dealing with the problems and obstacles (if where) during the implementation . 9 – Gathering complete and all out data about the general conditions of the project site and the surrounded areas , specially about the (restrictions , obstructions , problems , interferences , ……. etc.) . 10 – Well informed and have tendency for realizing the general situations and (economical , commercial) cases , as well as should have expectations to the prospectively alterations and able to deal with them for founding alternatives/solutions .
Student's obligation	• **Student's obligation** • Students should attend the theoretical lectures (1 hour weekly) and also should attend the practical-tutorial lectures at the laboratory or the class or the site (2 hours weekly). • Students requested to match deadlines for submitting their homework's and reports and assignments given by the lecturer. • Students should be ready for unannounced short quizzes from previous lectures. • Students are requested to provide detailed reports for the scientific visits arranged to the projects under construction. • Students should prepare themselves for the semester's major theoretical exams (announced exams). • Students should prepare themselves for the end year the theoretical exams (both first attempt or second attempt).

<table>
<tr><td>Required Learning Materials</td><td>

- Forms of teaching

The following teaching techniques are used in this course:
1- Using of white board activities. For explicating topics and solving problems.
2- Power point slides and data show. (sometimes)
3- Printed lectures hand-outs given to the students.
4- Video demonstration. (sometimes)
5- Detailed course book including course over view, objectives, syllabus and examples for questions and typical solutions given to students in the first lecture.
Team work or lecturer assistant (technicians) are very important for the (practical – tutorial) hours

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<tr><td>Evaluation</td><td>

<table>
<tr><th colspan="2">Task</th><th>Weight (Marks)</th><th>Due Week</th><th>Relevant Learning Outcome</th></tr>
<tr><td colspan="2">Paper Review</td><td></td><td></td><td></td></tr>
<tr><td rowspan="6">Assignments</td><td>Homework</td><td></td><td></td><td></td></tr>
<tr><td>Class Activity</td><td></td><td></td><td></td></tr>
<tr><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Seminar</td><td></td><td></td><td></td></tr>
<tr><td>Essay</td><td></td><td></td><td></td></tr>
<tr><td>Project</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Quiz</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Lab.</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Midterm Exam</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Final Exam</td><td></td><td></td><td></td></tr>
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<tr><td>Specific learning outcome:</td><td>

- Specific learning outcome:

Students when they are graduates and will been ready to works as a Surveyor or estimator , where the surveyor or estimator , is the person/individual or the (team , group , company) who measures , calculates and estimates the quantities of the work items for an engineering projects , and also the quantities of the primary construction/building materials . He also defines and describes the implementing technique procedures/progresses , as

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	well as the quantities and types of the needed (equipments , machines , tools , apparatus , sets , devices , instruments , …… etc.) . In addition to above mentioned , he also estimates and assess the (prices , rates , costs , wages , salaries , expenses) and appraise all others expenditures which concerning to those construction/building materials and all the another requirements for constructing , along with ensuring and deserving all rights of the (labors , team workers , employees and staffs) who charged for implementing the project . In spite of above surveyor or estimator must be very able to evaluate and estimate (the needed times with scheduling and arranging its periods and its time appointing) in the different stages/phases for all of the work items of the projects , in accordance with the engineering specifications and implementing conditions and the set of designs and plans . 1- 2- 3- 4- 5- 6-
Course References:	- **Course Reading List and References:** **Key references** • Quantity Surveying and Construction • Manual for consultant quantity surveyors • Construction Equipment book • English for the students of Civil Engineering • Laboratories test guides • PowerPoint slides from internet. • Short videos from internet. • Photos from internet. • Researches published in internet. • Previous lectures. • **كتاب التخمين و المواصفات للمؤلف مدحت فضيل**

	• كتاب حساب كميات المواد و المواصفات / الشروط العامة للمقاولات (الجزء الاول و الثاني) كتاب التخمين و المواصفات للمؤلف يوسف ناصر و نزار عسكر

Course topics (Theory)	Week	Learning Outcome
Quantity Surveying or Estimation in Construction Civil Engineering Projects →→→ Qualifications and capabilities of an Expert/Professional Quantity Surveyor or Estimator → Functions of professional quantity surveyor	1	
Type of estimation , conceptual estimation , detailed estimation →→→ Cost estimations of project construction , resources and elements of costs in construction projects → Material costs , Labor costs , Equipment costs , Overhead costs	2	
Wages and Salaries , labor and machinery productivity rates →→→ Supply and Demand , law of supply and demand in construction projects →→→ Quantity and Quality , philosophy of quantity and quality in construction projects	3	
Valuation of land , estate or (real estate) and plot → Valuation of building and property	4	
Work scheduling and planning in construction project , critical path method (CPM) for scheduling works →→→ Bill of Quantity , Advantages of bill of quantities	5	
Typical phases in construction projects , the triple constraint model in civil construction projects →→→ Projects-Facilities Costs , initial capital cost and operation and maintenance costs	6	
Investment project , feasibility of the investment projects →→→ Schematically diagram of phases in investment project life cycle	7	
Projects Management , project manager , fundamental steps of construction project management	8	
Contract or Agreement , construction contract agreement , construction and supplier contractor , owner or employer → Prime contractor and subcontractor , classification of contractors or contracting companies	9	
Type of construction contract , methods of construction contract pricing	10	
Tendering process of construction project procurement , tender documentation for construction projects	11	
Essential sections and main contractual documents of the construction contracts , sections of construction contracts , constructional contract document list	12	

Practical Topics	**Week**	**Learning Outcome**
Estimation and Engineering Sense , Engineering Sensibility , Guesstimate or Guesstimation , Intellectual estimation and conceptual appraisement →→→ Measuring units , international system of units SI and Imperial/English units , Physical Quantities With their SI Units , Imperial and Metric Units Conversion →→→ Some various/diverse updated (Quantified-Estimated Information) for mentally or visualizing inspection in (estimation , appraisement , valuation , assessment , ...) process →→→ Some essential geometric formulas for quantity survey and estimation , (Perimeter / Length) and (Area) formulas or equations → Some essential geometric formulas for quantity survey and estimation , (Surface Area) and (Volume) formulas or equations →→→ Exercises and examples of measuring , estimating and determining (thickness , lengths , heights , distances , areas and volumes) → More difficult exercises and examples of measuring , estimating and determining (thickness , lengths , heights , distances , areas and volumes) →→→ Applications in building-constructing works for (quantifying , determining , measuring and estimating) lengths and areas for different geometric shapes	1	
Approximately determination of areas for the (various – irregular) shapes → Exercises and examples for (quantifying , determining , measuring and estimating) length , distance , perimeter and area of complex irregular geometric shapes →→→ Exercises and examples of measuring and estimating areas and volumes for many different geometric shapes → Additional exercises and examples of measuring and estimating volumes for more different shapes →→→ Applications in building-constructing works for (quantifying , determining , measuring and estimating) areas , surface areas and volumes of more complex irregular geometric shapes	2	
Exercises and examples of measuring and estimating (time consuming , time period , duration , date , appointment , velocity and speed , productivities , discharge , ...) → Additional exercises and examples of measuring and estimating (time consuming , time period , duration , date , appointment , velocity and speed , productivities , discharge , ...) →→→ Densities , (bulk densities) of some essential construction – building materials → Applications for (determining , measuring and estimating) weights , surface areas , volumes and bulk densities , loads , forces , stresses , compressive strengths , bearing capacities of the different construction / building materials or their constructed – formed or structured elements →→→ More applications in building-constructing works for (quantifying , determining , measuring and estimating) weights , surface areas , volumes and bulk densities , loads , forces , stresses , compressive strengths , bearing capacities →→→ Exercises and examples in building-constructing works for (determining , measuring and estimating) expenses , cost prices , expenditures , rates , costs , values , wages , salaries , profits , revenues ..... →→→ Essential engineering units for quantifying and measuring construction – building work items in civil engineering projects	3	
Sequence of works in a building construction project →→→ Timeline elements , time bar chart or Gantt chart , Major steps to create up and modeling a construction project schedule → Basic format for preparing BOQ , Errors and mistakes limitation of bill of quantities	4	

Foundation of buildings , types of foundations , engineering designs of footings , bearing capacities of soils , quantifying and estimation of foundation and footing works (excavation , digging , drilling , removing and loading , backfilling) of soils , and foundation laying works →→→ Shuttering and block frame works or molding works , quantifying and estimation of wood shuttering works for casting and pouring concrete of (foundations , columns , walls , beams , slabs , roofs , stairways , lintels , parapets ..... etc.) →→→ Concrete definition , classification of concrete grades , mixtures design and patching , durability , compressive strength , Quantifying and Estimation of Concrete (Works and Materials) →→→ Plain and lean concrete , reinforced concrete , reinforcement steels for concrete , quantifying of steel bars requirements	5	
Definition of walls , types of walls depending on (designs , forms of constructing , used materials and functions) of the wall , Quantifying and Estimation of Wall (Works and Materials) →→→ Wall (bearer wall) building or masonry (primary-initially) materials , Cement – Sand Mortar Paste , Quantifying and Estimation of (Cement-Sand) Mortar Paste of mixture (1 : 3) →→→ Methods and types of wall finishing works , Quantifying and Estimation of cement-sand plastering (Works and Materials) , Quantifying and Estimation of gypsum plastering (Works and Materials) , dry wall works	6	
RCC buildings , Structural elements of reinforced concrete buildings (foundation and substructure , plinth , superstructure) → Type of reinforced concrete columns , Types of reinforced concrete (beams , ceiling-slab and stairs) → quantifying and estimation of all construction works for building and erecting the frame structure of a RCC building (from A to Z)	7	
Preparation Works for Fixing of Electrical and Mechanical Plumbing , HVAC (Heating Ventilation and Air Conditioning) , Mechanical and Electrical Installation Works →→→ Roof Slab and Stairs , Siding and Roofing Works , Installing Insulation , Priming – Painting and Installing Drywall → Quantifying and estimating of finishing works , Roofing , Tiles Laying and Flooring Works , Skirting , Molding , Trim , False Ceiling , Decorative Works , Fixing of Doors and Windows , glassing works , ... →→→ Implementing and executing percentage rate in construction projects , methods of estimating (implemented percentage rate)	8	
Earthworks in civil engineering projects , cut and fill , excavation in the form of cuts or embankment in the form of fills →→→ Methods for (determining , measuring and estimating) filling / cutting quantities of earth works from cross sectional areas → Applications for (quantifying , determining , measuring and estimating) filling / cutting quantities of earth works from cross sectional areas →→→ Methods for (determining , measuring and estimating) filling / cutting quantities of earth works from cross sectional areas and longitudinal profiles → Applications in road construction projects for (quantifying , determining , measuring and estimating) filling / cutting quantities of earth works from cross sectional areas and longitudinal profiles →→→ Applications for (determining , measuring and estimating) filling / cutting quantities of earth works from hillside slop , contour lines	9	
Retaining walls , types of retaining walls , Typical Design of Gravity Retaining Wall of type (steps-build up masonry retaining wall) , Typical design of reinforced concrete retaining wall of type (	10	

cantilever wall) →→→ quantifying and estimation of all construction works for building and erecting a gravity retaining wall step by step → quantifying and estimation of all construction works for building and erecting a reinforced concrete retaining wall of type (cantilever wall) step by step		
Sequence of works in a road construction project →→→ Measuring and estimating quantities of road construction and paving (works and materials) → More exercises and examples of measuring and estimating quantities of road paving works	11	
Methods for Measuring and estimating quantities of flowing waters and runoffs , estimation of water flow discharge quantities →→→ Exercises and examples for measuring and estimating quantities of flowing waters in the open channels , canals , pipes , sewers , drains → Applications for estimating and determining typical dimensions and designed capacity of (culverts , conduits , pipes , gutters , canals , aqueducts , sewers , drains , …….)	12	

Questions Example Design

- **Examinations (question design):**

Ministry of Higher Education & Scientific Research

Erbil Polytechnic University

Academic year : 2019 – 2020

Class: 2nd year

Subject: Quantity Surveying

Time: 135 min.

ote :

1 - *The handwriting clarity is necessary , and all written answers should be readable .*

2 - *The results or the answers numbers are not considered correct or complete answers , if the solving steps and calculations drafts are not clear and answers numbers are without quantifying units or not readable .*

3 - *Sketches and illustrative drawings of the solutions and the correct writing of (equations , formulas and rules) are considered a significant part of solutions .*

4 - *The **typical answers and solutions** of the exam questions will be announced in Road Department in the same date when the exam ends .*

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1 / An estate where its plan and dimensions are shown in fig. (1) , leased according to a contract for espe

activity by **3800 $/donm/year** from **19/Aug. /2016** to **15/Nov. /2019** , calculate the amount of accumulated tota lease of that contract for the given period

18 Marks

2 / Define briefly **(only 4 four)** of the following :

Labour costs , Quantity over quality , Project , Force majeure , Change order , Punch list

20 Marks

3 / In a road construction project site , there is a cylindrical tank to store fuel for project machineries . The ta of (inner) diameter about **222.8 inch** and its placed horizontally at the site , while the tank contains **750.16 barrel** of size 215 liter) of fuel , the vertical depth of fuel level will be about **397.26 cm** . Find the **length of that tank** in (.

22 Marks

4 / **((Answer only (1 one) of the following))**

1 - List and write down **(only 5 five)** of the main sections and essential clauses of a construction contract agreemen

2 - For valuation of a land or an estate we should take into consideration some important criteria , list and ment briefly **(only 5 five)** of those criteria .

15 Marks

5 / The drawn isometric model in fig. (2) is for wall-frame of a showroom building , to quantify the **excavation w** of a strip foundation of (**width 70 cm** , and **depth 95 cm**) for the building walls . Estimate the quantity of t **excavation work** in m^3 , and then quantify the excavated soil in **number of dump-truck** of (**12 m^3** in capacity) .

25 Marks

Good luck

Saud Ahmed Hussein

Typical answers

Q2 / Define briefly **(only 5 five)** of the following :

Labour cost

Those costs or expenses includes the costs of all kinds of labours and those who work in the project such as (labours , workers , employees , technicians , teams , staffs , ……. etc.) , putting into consideration the types of the wages , salaries , rewards , incentives , bonus , hazards and extra hours/overtime works , in addition to the costs of (transportation , feeding and lodgings) of them . Also the labour costs are includes the costs of health insurance and providence of vocational/occupational safety and the social insurance for all staffs

and all the project work teams .

Quantity over quality

Quantity over Quality mean to sacrifice quality of produces , that is means its more important to get more of something than to get a few things that are high quality . its often used to hurry people up , encourage people to get something done quickly .

Project

Project : the main target of any project is for developing something , project is a piece or some of work or an activity (often involving many people) that's planned and organized carefully for achieving a particular purpose in a defined time period .

Force majeure

Force majeure refers to a common clause in contract that essentially prevent one or both sides from fulfilling their liability or obligations under the contract , when an extraordinary or uncontrollable event or effect arising such as war , strike , riot , terror , crime , lighting , explosions , lockouts , or those events will described by the legal term act of God (hurricane , flood , windstorm , earthquake , volcanic , eruption , epidemic/ pandemic , lesion , plague …….. etc.)

Change order

Change orders are agreements (after negotiations through change requests) between the owner and contractor to change the scope , price , schedule , quantities (increased or reduced) , plans , specifications , time for completion or similar term of the contract . They almost always result in increased costs

Punch list

Sometimes called a " punch out " or " walk through – inspection list ", a punch list is a document created by the owner at the end of a project that outlines any construction work not completed or conforming to the contract specifications . Listed items could be fixing damaged flooring or incorrect appliance installations . The owner presents the punch list to the contractor who must complete the items before final payment is made .

Q4 / ((Answer only (1 one) of the following))

1 – List and write down **(only 5 five)**

1 - Project description and scope of work .

2 - Project cost and pricing scheme .

3 - Time frame and schedule/calendar of construction works .

4 - Payments and installments basis .

5 - Specifications and construction documents list .

blueprints , bill of quantities , drawings , details , …… etc. .

6 - Contract statutes or contract laws .

general conditions , special conditions , authority and responsibilities , disputes , protection .

7 - Insurance – warranties coverage .

8 - Final liquidation and termination .

2 – list and mention briefly **(only 5 five)** of those criteria

1 - The prevailing values of the lands similarly situated round about same area within same region .

2 - The state of the land , area , shape , size and dimensions , topography , elevation and frontage of the plot of land , orientation and windward direction .

3 - Services available such as schools , market , hospitals , recreation centers , parks etc. .

4 - Type of locality i.e. industrial , residential or commercial and also the status of locality i.e. poor class , middle class or upper class .

5 - Communication and transportation facilities such as posts , telegraphs , telephone , internet , electricity , roads , railways , buses etc. and their locations in the vicinity .

6 - Predominant character of the neighbourhood area .

7 - Existence or nearby of sources of environment pollution , noise , limitation and obstructions .

8 - Useful economic future life , or the extent of end use and utility

Extra notes:

1 – I demonstrate expressly my opposition to bologna process concerning to reducing number of weekly hours for each academic semester , therefore I will request that weekly hours should be amended to 5 hours (2 hours for theoretical subjects) and (3 hours for tutorial-practical subjects) broken up into 1 hour for the tutorial and 2 hours for the practical lesson
In addition to that , the subject should be study in 4th semester

2- recommended that the name of the course maybe amend to (Quantitative Survey - Estimation)

3- The template is well established and covered most requirements, just I suggest if possible distribute the similar course books from the available faculties through this ministry to each other achieve better, balanced and standard outputs for the benefit of pupils and future updating.

4- Team work or lecturer assistant (technicians) are very important for the (tutorial – practical) hours

External Evaluator

The course book prepared by my colleague is properly arranged and covers the main requirements of the lesson. The lecturing procedures are identified properly. The assessment scheme and forms of teaching are arranged in a way that the student could understand clearly. It can be said that student will be satisfied with this course book and it promises a good outcome.