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**Department of Soil & Water Science**

**College of Agriculture**

**University of Salahaddin**

**Subject: Land Levelling**

**Course Book – *For Second Year***

**Lecturer's name : Dr. Tariq H. Karim**

**Academic Year:  2021-2022**

**Course Book**

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| **1. Course name** | **Land levelling** |
| **2. Lecturer in charge** | **Dr. Tariq H. Karim** |
| **3. Department/ College** | **Soil and Water / Agriculture** |
| **4. Contact** | **e-mail: solavtariq @ yahoo.com****Tel: (07504426174)** |
| **5. Time (in hours) per week**  |  **2 hrs Theory and 3 hrs practical**  |
| **6. Office hours** | **Tuesday: 12:00- 1:00** |
| **7. Course code** |  |
| **8. Teacher's academic profile**  |  |
| **9. Keywords** |  |
| **10. Course overview:**  **The course is important to provide the student with the necessary information including determination of centroid, best fit slope, plane methods for land levelling, calculation of volume of cut and fill besides laser technique as new methods for land levelling.**   |
| **11. Course objective:****To make students to be acquainted with methods of land levelling, calculation of volume of cut and fill.** |
| **12. Student's obligation****The attendance of the students is below our ambition level, but they respond to the lectures with interest. They have taken the first examination and more than 60% of the students passeed it. The grades ranged from a minimum of 42 to a maximum of 85%.**  |
| **13. Forms of teaching****I am using both data show and the white board during teaching. The data show is used for presenting charts, figures, plates, while the white board is used for performing calculations**  |
| **14. Assessment scheme** **I will give two examinations before the final one. The grade is distributed among the theoretical examinations (90%) and class activity(10%).** ‌ |
| **15. Student learning outcome:** **The students will be acquainted with: methods of land levelling and calculation of volume of cut and fill.** |
| **16. Course Reading List and References‌:****Key References:**1. **Michael, A.M. 1978. Irrigation Theory and Practice, 1st edition, Vikas Publishing house, PVT LMD.**
2. **Hachm, A,Y and H.I. Yaseen. 1992. Engineering Field Irrigation Systems, College of Engineering, University of Mosul.**
3. **On-line References.**
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| **17. The Topics:** | **Lecturer's name** |
| Kindly see the attached paper at the end of the form. Examination date: 17 /4/2022 |  T.H.Karim |
| **18. Practical Topics (If there is any)** |  |
| Lectured by the Lecturer of the Practical part  |  |
| **19. Examinations:** ***Mainly compositional***Q1)Define land levelling. Land levelling can be defined as reshaping of the land surface to the desired graded surfaceQ2)What are the stages of land levelling? Answer: 1) rough levelling, 2) land levelling , 3) land smootheningQ3) Determine the elevation of a point with coordinates of ( 70, 30 ) after land levelling. Suppose that the average land elevation is 50 m and the best fit slope in x –direction is 0.2% and with no slope in y-direction. The coordinates of the centroid are ( 20, 25).Answer: H = hc + sx( x –Xc) + sy ( Y-yc); H= ? , hc = 50 m, sx = 0.2/1000= 0.002, sy=0, x = 70, Xc = 20 y= 30, yc =25H = 50 + 0.002( 70 -20) + 0( 30 – 25) = 50 + 0.1 = 50.100 m |
| **20. Extra notes:**No further comments |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ** This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.*(A peer is person who has enough knowledge about the subject you are teaching; he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).*ئه‌م کۆرسبووکه‌ ده‌بێت له‌لایه‌ن هاوه‌ڵێکی ئه‌کادیمیه‌وه‌ سه‌یر بکرێت و ناوه‌ڕۆکی بابه‌ته‌کانی کۆرسه‌که‌ په‌سه‌ند بکات و جه‌ند ووشه‌یه‌ک بنووسێت له‌سه‌ر شیاوی ناوه‌ڕۆکی کۆرسه‌که و واژووی له‌سه‌ر بکات.هاوه‌ڵ ئه‌و که‌سه‌یه‌ که‌ زانیاری هه‌بێت له‌سه‌ر کۆرسه‌که‌ و ده‌بیت پله‌ی زانستی له‌ مامۆستا که‌متر نه‌بێت.‌‌  |

**Syllabus for theoretical Land Levelling/Second Year / Soil and Water Dept.**

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| **#** | **Topic** | **Lecture duration** | **Lecturer** |
| 1. | Introduction, Basic concepts, definitions and synonyms to land levellingIntroducing the methods of establishing grid spacing | 2 hrs 3 hrs | T.H.KarimNadereh D. Salamat |
| 2. | Land levelling criteria, stages of land levelling.Establishment of grid spacing in field | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 3. | Centroid of regular and irregular shapesIntroduction to differential leveling | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 4. | Centroid of composite shapes, numerical determination of centroidIntroduction to equipment that are used for differential leveling (setup) | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 5. | Establishment of grid system and calculation of design slopeMeasuring the elevation of points using level and leveling staff | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 6. | Methods of land levelling( plane method)Determination of centroid using moment method | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 7. | Calculation of depth of cut and fills, Calculation of area of cut and fills.Determination of centroid for irregular shaped area | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 8. |  Calculation of volume of earth works Office work for determination of cut and fill | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 9. | Earthwork balance and Soil shrinkage during land levellingOffice work for determination of cut and fill for established grid | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 10. | Profile method for land levellingIntroducing the electronic total station to measure differences in elevation | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 11. | Plan inspection method for land levellingUsing electronic total station to measure horizontal and zenith angle | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 12. | Contour adjustment method for land levellingUsing electronic total station to measure traverse sides | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 13. | Design of terraceDetermination of cut and fill for irrigation canals | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 14. | Land levelling equipmentMeasuring the elevation of points to determination cut and fill for irrigation canals | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |
| 15. | Laser land levellingOffice work for determination of cut and fill for irrigation canals | 2 hrs3 hrs | T.H.KarimNadereh D. Salamat |