LANDMARK UNIVERSITY, OMU-ARAN
ABE 325 COURSE COMPACT
COLLEGE: Science and Engineering
DEPARTMENT: Agricultural and Biosystems Engineering
PROGRAMME: Agricultural Engineering
COURSE COMPACT for: Photogrammetry (ABE 325)

Course

Course code: ABE 325
Course title: Photogrammetry
Credit unit: 2
Course status: Compulsory

Lecturers' Data
(1) Name of the lecturer: Engr. AKINYEMI, Banjo A
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(2) Name of the lecturer: Engr. E.A. Alhassan
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INTRODUCTION TO THE COURSE

Course Description: This course is necessary to expose students to photogrammetry which is the science of obtaining reliable information about the properties of surfaces and objects without physical contact with the objects, and of measuring and interpreting this information. Photogrammetry is also a system in which an object or an event in time and space is recorded onto a sensitized film or plate by means of appropriate camera or other imaging system, and in which the subsequent image is measured in order to define, portray, digitize or in some way classify the object or event.

Course Justification: Agricultural Engineers will always have to work with other professionals in their day to day activities. One of such professionals is the Surveyors. This group of professionals are supposed to be available to complement the works of the Engineers. However, there may be some circumstances when they are either unavailable or will rely on the Engineer to put them through on what they are supposed to do and the details of how it should be carried out. Hence the need to expose the students to the pros and cons of various types of photogrammetry (an aspect of surveying) so they will not be found wanting when they begin to practice.

Course Objectives: At the end of this course, students would be able to:

i. understand what contours and contouring are
ii. understand the methods of contouring

iii. understand the how to interpolate contours as well as the use of contour plans and maps
iv. understand how to calculate areas and volumes
v. understand some basic principles of setting out

Course Content: Elements of photogrammetry, photogrammetric equipment, principles and uses. Errors of measurements. Evaluation of single photographs. Further work on contours and contouring. Methods of contouring; contour interpolation and uses of contour plans and maps. Areas and volumes. Setting out.

Course Expectations:

S/N	GRADING	SCORE(%)
1.	**Continuous Assessments** • C.AI • C.AII (Mid-Semester Test) • C.AIII	 **7%** **15%** **8%**
2.	**Assignment**	
3.	**Practical (Laboratory work)/ Case Studies**	**10%**
4.	**Final Examination**	**60%**
5.	**Total**	**100**

Course Delivery Strategies: Lecturing method complimented with illustrations and class works, tutorials *etc*.

Course Duration: 2 hours weekly interjected with practical sessions

LECTURE CONTENT

Module 1
Week 1: Introduction to photogrammetry
Objectives: The students at the end of the lectures for the week should be able to define photogrammetry, outline its branches, classifications and applications to agriculture

Description

First hour:
Basic definition of photogrammetry
Second hour
Branches, classifications and applications to agriculture
Study Question: 1. Ask questions on the relevance of photogrammetry to Agricultural Engineer.
Reading List :

- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher).

Module 2
Week 2: The aerial photograph
Objectives: The students at the end of the lectures for the week should be able to understand the components of projection such as parallel projection, orthogonal projection, central projection and the classification of aerial photograph.

Description
First hour:
Components of projection
Second hour
Calssification of aerial photograph
Study Question: 1. Differentiate between parallel and orthogonal projection.
Reading List:

- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher).

Module 3
Week 3: Geometry of a vertical photograph
Objectives: The students at the end of the lectures for the week should be able to list some errors in photogrammetry, congruency between map and photographs, understand what is photographic scale, how to compute flight plan and the printing process.

Description
First hour:
Errors in photogrammetry
Second hour
Maps and photographs

1. **Study Question: 1.** Differentiate between maps and photographs
2. Errors found in a downloaded photographic map.

Reading List :

1. Elements of photogrammetry

Module 4
Week 4: The aerial camera
Objectives: The students at the end of the lectures for the week should be able to identify the types of aerial camera, the photographic film, processing of exposed film, orientation, elements of relative orientation, absolute orientation.

Description

First hour:
Types of aerial camera, photographic films
Second hour
Processing of exposed films

Study Question:

1. How do we process exposed films ?
2. What are the dangers of exposing film outside the dark room ?

Reading List :

- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher).

Module 5
Week 5: Orthophotographs and Orthophotomaps
Objectives: The students at the end of the lectures for the week should be able to understand that photographs are constructed from vertical or near-vertical aerial photographs, such that the effects of central perspective, relief displacement, and tilt are (practically) removed. The resulting orthophotograph is an orthographic project. Orthophoto maps are orthophotographs with overlaid line map data.

Description

First hour:
Vertical and near vertical aerial photographs
Second hour
Relief displacement, central perspctive

Study Question:

1. What are the uses of orthophotographs ?
2. Methods of orthophotographs

Reading List :

- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher).

Module 6
Week 6: When to use and when not to use photogrammetry
Objectives: The students at the end of the lectures for the week should be able to know and understand when to use and when not to use photogrammetry.

Description

First hour:
When to use it
Second hour
When not to use it

Study Question:

In what situations and circumstances do we use and decide not to use photogrammetry.

Reading List :

- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher).

Module 7
Week 7: MID SEMESTER EXAMINATION

Module 8
Week 8: Revision
Objectives: All the topics covered so far in the class would be revised with the students and the continuous assessment would be taken.

Module 9
Week 9: Introduction to contours
Objectives: The students at the end of the lectures for the week should be able to have a proper understanding of what contours are.

Description

First hour:
Meaning of contours
Second hour
Classification of contours

Study Question:

Identify through maps contours shown.

Reading List :

- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher).

Module 10
Week 10: Areas and Volumes (Introduction)
Objectives: The students at the end of the lectures for the week should be able to have a proper understanding of what contours are and their interpretations.

Description

- **First hour:**
  Detail description of the topic under consideration, with illustrations, examples, definitions *etc.* For example, introduction to contours (vertical interval and horizontal equivalent, characteristics of contour, field methods of contouring, graphical interpolation *etc*)
- **Second hour**
  Detail description of the topic under consideration, with illustrations, examples, definitions etc. For example, areas and volumes (areas determination, areas enclosed by straight lines, areas from triangles)

Study Question:

Ask questions on some of the discussed problems

Reading List :

- Lecture note (provided for the students in pdf format)
- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher)

Module 11
Week 11: Areas
Objectives: The students at the end of the lectures for the week should be able to have a proper understanding of how to calculate areas using various approaches.

Description

- **First hour:**
  Detail description of the topic under consideration, with illustrations, examples, definitions *etc*
- **Second hour**
  Area from coordinates, areas enclosed by irregular lines (trapezoidal rule, Simpson's rule, calculation of cross sectional areas *etc*.

Study Question:
Assignment would be given to students to solve problems on areas
Reading List :

- Lecture note (provided for the students in pdf format)
- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher)

Module 12
Week 12: Volumes
Objectives: The students at the end of the lectures for the week should be able to have a proper understanding of how to calculate volumes using various approaches.
Description

- **First hour:**
  Detail description of the topic under consideration, with illustrations, examples, definitions etc.
- **Second hour**
- Volume determination (volumes from cross sections, volumes from spot height, volumes of contours).

Study Question:
Students should solve problems on volume.
Reading List :

- Lecture note (provided for the students in pdf format)
- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher)

Module 13
Week 13: Second mid semester test

Objectives: To test how much of the topics covered are properly understood by the students, with a view of re-visiting the aspects where they are having some difficulties.
Description

- **First hour:**
  Brief revision of the topics covered so far.
- **Second hour**
  Test

Module 14
Week 14: **S**etting out
Objectives: The students, at the end of the lesson, should be able to understand the principles of setting out. To test how much of the topics covered are properly understood by the students, with a view of re-visiting the aspect(s) where they are having some difficulties

Description

- **<u>First hour:</u>**
  Detail description of the topic under consideration, with illustrations, examples, definitions *etc.* For example, aims of setting out, preliminaries of setting out, methods of horizontal control, methods of vertical controls, setting out of a building from ground floor level *etc*
- **<u>Second hour</u>**
  Brief overview of the topics covered, tutorials.

Reading List :

- Lecture note (provided for the students in pdf format)
- Schofield, W. and Breech, M. (2007). Engineering surveying. Sixth edition. Elsevier (Publisher)

Module 15
Week 15: Revision
Objectives: The students at the before the end of the lectures for the week would be able to ask questions on areas they don't understand and answers would be provided.

Module 16
Week 16: Examination

HOD'S Comments: Course Compact is adequate
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Name. Dr. Okunola A.A **Signature:** [signature] **Date:** 23/1/2017