



**Department of Plant Protection**

**College of Agricultural engineering sciences**

**University of Salahaddin**

**Subject: Principles of Field Crops**

**Course Book – (Year 2)**

**Lecturer's name: Asst. Prof. Dr. IQBAL MURAD AL RAWI**

**Lecturer's name: Jwan Jawdat (MSc)**

**Academic Year: 2022/2023**

# Course Book

1. Course name	Principles of Field Crops
2. Lecturer in charge	
3. Department/ College	Plant Protection / Agricultural engineering sciences
4. Contact	e-mail: iqbal_alrawi@yahoo.com Tel: (07504701191)
5. Time (in hours) per week	Theory: 2 Practical: 3
6. Office hours	Availability of the lecturer to the student during the week
7. Course code	
8. Teacher's academic profile	<p><u>Education and Qualifications</u></p> <p><b><u>Education and Qualifications</u></b></p> <p><b>(A) Schooling</b>  <b>1972 - 1977</b> : ninawa Primary School. Mosul,Iraq.  <b>1978 - 1983</b> : Kurtoba Secondary school, Mosul,Iraq.</p> <p><b>(B) University</b>  <b>1984 – 1987:</b>Graduating for <b>B.Sc.</b> in Biology Dep.,College of Science, Mosul University. Iraq.  <b>1990 – 1992:</b> Postgraduate students for <b>Msc.</b> degree at Biology Dep., College of Science, Mosul University, Iraq.  <b>2008-2011</b> : Postgraduate student for <b>Ph.D.</b> degree at Field Crops Dep. Agriculture College. Salahaddin University, Erbil,Kurdistan Region,Iraq</p> <p><b><u>Employment</u></b>  <b>1992 – 1997</b> : Assist. Lecturer at Basic Science Section, Mosul University. College of Agriculture &amp; Forestry, Mosul University. Iraq.  <b>1998 – 2000</b> : Assist. Lecturer at Plant Production Dep.Agriculture College. Duhok University, Duhok, Kurdistan Region,Iraq</p>

	<p><b>2000 – 2002 :</b> Assist. Lecturer at Plant Production                  Dep.Agriculture College. Salahaddin                  University, Erbil, Kurdistan                  Region,Iraq</p> <p><b>2003 – 2008 :</b> Lecturer. at Plant Production                  Dep.Agriculture College. Salahaddin                  University, Erbil, Kurdistan                  Region,Iraq</p>
<p><b>9. Keywords</b></p>	<p>Classification of field crops, Evolution of Field Crops, Factors limiting crops production and distribution, Essentials for Growing Crops, Seed and seeding practices, Factors of Germination, Dormancy in seeds, Planting Methods, Fertilizers and Fertilization, Irrigation, Weed control, Crop rotation.</p>
<p><b>10. Course overview:</b></p> <p>The course will cover the agricultural status of Iraq has been pays little attention to agriculture, so its progress and development is below estimated levels.</p> <p>Iraq for example, displays a huge gap between the production and consumption of most crops: cereals (wheat, barley, and rice in particular) and industrials crops (oil, fiber, and sugars) despite the availability of all production requirements. As a result Iraq imports most of these crops by hard currency at very high costs.</p> <p>We have to build up a culture for how to point out these problems and to understand the essential requirements for crops depending on our domestic human resources and facilities.</p> <p>Accordingly we have prepared this course to be available for our students to help them become familiar with local agricultural situation, through the principles and cultural practices of field crops production in the country.</p>	
<p><b>11. Course objective:</b></p> <p>The course will cover texts on review of some principles of planting , practices, botanical description of field crops, in addition to get information about geographical distribution, mean word production, land preparation, suitable environments, suitable soils, fertilization, seed dormancy and crop rotation application in field crops.</p>	
<p><b>12. Student's obligation</b></p> <p>The student must be commitment in the presence of practical and theoretical lectures and weekly preparation in order to be ready to perform quizzes and quarterly exams, in addition to providing weekly reports for practical lectures.</p>	
<p><b>13. Forms of teaching</b></p> <p>Different forms of teaching will conducted to gain the objectives of the course, such as:</p> <ol style="list-style-type: none"> <li>1. Power point presentations.</li> <li>2. Practical lecturers.</li> </ol>	

#### 14. Assessment scheme

Students are required to conduct two writing tests in each theoretical and practical lectures, each exam will be on 100 mark then it will transferred to 40 mark, 25 on writing test, while 15 mark for practical lectures. The final examination will be on 60 marks.

#### 15. Student learning outcome:

The students must be known an history of crops cultivation, major characteristic of field crops, essential features of crop production since the dawn of history until now, classify the crops according to their growing season, agronomic classification, and some factors limiting crops production and distribution such as environmental factors, implement use in preparation of land to planting, irrigation, weed control, seed dormancy and crop rotation.

#### 16. Course Reading List and References:

1. Khalaf, A. S. 2010. Principles of Field Crops. Duhok University Press. (Text Book).

2. Magazines and internet.

#### 17. The Topics:

#### Lecturer's name

Week NO.	Subject	Asst. Prof. Dr. Iqbal Murad Alrawi
1st	Brief History in Crop Cultivation.	
2nd	Geographical Origin of Crops.	
3rd	Classification of Crop Plants.	
4th	Crops Classification Chart.	
5th	Factors Limiting Crops Production and Distribution.	
6th	Soils Biotic Factors	
7th	Essentials for Growing Crops.	
8th	Land Preparation, Seed and Seeds Practices.	
9th	Seed Germination and Factors of Germination.	
10th	Dormancy in Seeds.	
11th	Seeding Crops.	
12th	Seed Germination. Factors of Germination.	
13th	Dormancy in Seeds.	
14th	Irrigation. Weed control.	
15th	Crop rotation.	

#### 18. Practical Topics (If there is any)

Practical part consists of botanical description and some application of seeding, plowing, germination, exercises on application of crop rotation. In addition to Know the scientific names of field crops and classification of field crops according to agronomic (economic), life cycle, spatial purpose and growing season.

#### 19. Examinations:

Q1. Describe the essential features of crop production since the dawn of history until now.

Answer:

- (1) Gathering and preserving the seed of the desired crop plants.
- (2) Destroying other kinds of vegetation growing on the land (weeds).
- (3) Stirring the soil to form a seedbed.
- (4) Planting the seed when the season and weather are right as shown by past experience.
- (5) Protecting the crop from natural enemies.
- (6) Gathering processing and storing the products.
- (7) Removing by hand the destructive insects in the fields.

Q2. What is the major characteristic of field crops?

Answer:

The growth habits of crops that are grown on huge open land and are determinate as they flower and mature at the same time, they harvest at the same time. An exception to this rule is cotton and tobacco leaves, which can pick more than one time. Field crops also tolerate transportation, handling and longer storability than other crops.

Q3. Numerate the centers of origin according to Vavilov. With examples.

Answer:

- 1- Centers of China - millets, broomcorn, sugarcane, and sesame.
- 2- India- rice, sorghum, cotton, Sudan grass, chickpea, Mungbean, sugarcane,
- 3- Middle of Asia- common wheat, rye, peas, lentil, faba bean, flax, sunflower, safflower, cotton.
- 4- Near east- wheat spp., barley, rye, oat, alfalfa, lathyrus, faba bean, sesame, rape.
- 5- Mediterranean -cereals, legumes, oat, clovers, lathyrus.
- 6- Ethiopia- barley, sorghum, millet, faba bean, lathyrus, safflower, castor bean, coffee.
- 7- South Mexico and middle America- maize, cotton.
- 8- Latin America (Southern America) - maize, cotton, tobacco.

Q4. Explain how Iraq and Kurdistan Region as Origin of some crops.

Answer:

Archaeological remains of barley were found at the Jarmo site near Jumjuma, between Kirkuk and Sulaimania Governorates about 6800 B.C.

Also carbonized kernels of wheat about 6000-7000 years old were found by American archaeologists at the Jarmo site. It appears extremely likely that chickpeas were domesticated in the Fertile Crescent, which Iraq was a part of it 7000 years ago.

Van der Maesen (1987) reported that chickpea, from earliest time (before 3000 B.C.) denotes as a staple food of minor importance in Mesopotamia.

Q5. All cultivated plants were divided by Vavilov, into two groups. What are these two groups?

Answer:

- 1- Those that originated from weeds such as rye.
- 2- Fundamental crops which are known only in cultivation, such as maize.

Q5. Classify crop plants according to their agronomic classification.

Answer:

1- Cereals (or Grain Crops)

Cereals are grasses grown for their edible seeds. The term "cereal" is applied either to the grain or to the plant itself; e.g. wheat, barley, rice, maize, sorghum, oats, rye, and millet.

2- Legume for Seeds (Pulses)

Such as broad bean, chickpea, lentils, field beans, peas, cowpeas, soybeans, and Mung bean.

3- Forage Crops

Fresh or preserved, utilized as feed for animals. Forage crops include grasses, legumes, crucifers, and other crops cultivated and used for hay, pasture, fodder, silage or soilage.

4- Root Crops

Crops designated in this manner are grown for their enlarged roots. The root crops include sugar beets, carrots, turnips, sweet potatoes.

5- Fiber Crops

Fiber crops include cotton, flax, ramie, kenaf and hemp.

6-Tuber Crops

A tuber is not root; it is a short, thickened, underground stem such as potato.

**7- Sugar Crops**

Sugar beet and sugarcane are grown for their sweet juice from which sucrose is extracted and crystallized. Sorghum as well as sugarcane is grown for syrup production.

**8- Drug Crops**

Drug crops include tobacco and mint.

**9- Oil Crops**

Oil crops include flax, soybeans, peanuts, sunflower, safflower, sesame, castor bean. Cottonseed is an important source of oil, and corn furnishes edible oil.

Q6: Write table including English and scientific name of eight various field crops.

Q7: Define the following terms:

Agronomy – Short day plants- Photoperiodism - soil texture

Q8: How we can increase available soil water in dry-land. Then describe the methods of soil erosion control.

Q9: What are the general characteristics of good quality of seeds?

**20. Extra notes:**

/

**21. Peer review**

**Practical Topics (If there is any)**

**Week 1 – Introduction of Field Crops**

**Week 2 – Seeds**

**Methods to seed determination and distinction, Advantage of seed identification, Seed germination, Dormancy in seeds, Seed testing.**

**Week 3 – Seed germination**

**Week 4 – Some Important Field Crops**

**Cereals: Wheat, Barley, Rice, Corn.**

Pulse crops: Horse bean, Chick pea, Lentil.

Oil crops: Sunflower, Sesame.

Fiber crops: Cotton, Flax.

**Week 5 – Some important of Pulse Crops**

**Week 6 – Soil management (land preparation):**

Functions of tillage, Good plowing conditions, Depth of plowing, Time of plowing, Smoothing and harrowing, Levelling, Equipment uses to plowing, smoothing and levelling, Primary tillage, Secondary tillage, Mold board plow, Chisel plow, Disc plow, Rotary plow, Rotary cultivator, Spike tooth harrow, Spring tooth harrow, Sub-soiler plow, Rolling or rotary harrow.

**Week 7 – Fertilizers and Fertilizer Application:**

Kind of fertilizers: Simple and Compound Fertilizers, Manures :Barnyard Manures, Green manures, Methods of fertilizer application. Role of Microbial fertility.

**Week 8 – first exam**

**Week 9 – Crop management :**

**Methods of Sowing:** 1. According to performance : Broad casting, Drilling, Runnels, Transplanting. 2. According to humidity: Dry land farming, Wetness farming, Water supply farming, sowing in squares. Replanting, Thinning, Cultivation, Rouging. Depth of planting, Spaces between plants, Plant density, Maturity and Harvesting , Disadvantage of early harvesting.

<p><b>Week 10 – Weeds &amp; Weed Control:</b> Weed classification, 1. Natural classification, 2. Artificial classification: According to abounds, According to life cycle, According to poisoning, Persistence of weeds, Weed control methods, 1. Biological control, 2. Chemical herbicides</p> <p><b>Week 11 – Crop rotation and Tillage</b></p> <p><b>Week 12 – Herbicides and Plants &amp; Herbicides and soil</b></p> <p><b>Week 13 – Second Examination</b></p>										
<p>In this section The lecturer shall write titles of all practical topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the lecture</p>	<p>Lecturer's name ex: (3-4 hrs)  ex:</p>									
<p><b>19. Examinations:</b></p> <p>1- Blanks such as: purposes of tillage are 1- ----- 2- ----- 2- -----</p> <p>2- Definitions, such as: 1- Agriculture 2- pH</p> <p>3- Justifications</p> <p>4- Differences</p> <p>5- Explanation, such as: what do you know about 1- what are the reasons of dormancy in seeds</p> <p>6- Correct and mistake expressions, such as: Put a correct sign next to correct expression and wrong sign next to wrong expression and correct the wrong expression</p> <p>7- Link the expressions present in item (A) with what is suitable for them in items (B) and (C) and explain the relation between them.</p> <table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;">Item (A)</td> <td style="width: 33%;">(B)</td> <td style="width: 33%;">(C)</td> </tr> <tr> <td>Barley</td> <td>Seed coat</td> <td>8-16 millimhos/cm</td> </tr> <tr> <td>Water penetrate the seed</td> <td>Tolerant to salinity</td> <td>Micropyle or hilum</td> </tr> </table>		Item (A)	(B)	(C)	Barley	Seed coat	8-16 millimhos/cm	Water penetrate the seed	Tolerant to salinity	Micropyle or hilum
Item (A)	(B)	(C)								
Barley	Seed coat	8-16 millimhos/cm								
Water penetrate the seed	Tolerant to salinity	Micropyle or hilum								
<p><b>20. Extra notes:</b> Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.</p>										
<p><b>21. Peer review</b> <span style="float: right;">پیداچوونہوہی ہاوہل</span> This course book has to be reviewed and signed by a peer. The peer approves the contents</p>										



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).*

ئەم كۆرسىۋوكە دەبىت لەلايەن ھاۋەلىكى ئەكادىمىيە سەير بىكرىت و ناۋەرۆكى بابەتەكانى كۆرسەكە پەسەند بىكات و جەند ووشەيەك بنووسىت لەسەر شىاۋى ناۋەرۆكى كۆرسەكە و واژووى لەسەر بىكات. ھاۋەل ئەو كەسەيە كە زانىارى ھەبىت لەسەر كۆرسەكە و دەبىت پەلى زانستى لە مامۇستا كەمتر نەبىت.