

Ministry of Higher Education and Scientific research



**Department of Forestry**

**College of Agricultural Engineering Sciences**

**Salahaddin University-Erbil**

**Subject: Forest Plantation- Theory & Practice**

**Course Book: Third Stage**

**Lecturer's name (Theory): Assist Prof Dr. Sherzad Omar Hamad**

**Lecturer's name (Practice): M. Shilan Abdurrahman Mirsar**

**(Lecturer)**

**Academic Year: Spring Semester 2023-2024**

**Course Book**

<b>1. Course name</b>	<b>Forest Plantation - Theory and Practice</b>
<b>2. Lecturer in charge</b>	<b>Assist Prof Dr. Sherzad Omar Hamad M. Shilan Abdurrahman Mirsar</b>
<b>3. Department/ College</b>	<b>Forestry / Agricultural Engineering Sciences</b>
<b>4. Contact</b>	<b>E-mail: <a href="mailto:sherzadomer@ymail.com">sherzadomer@ymail.com</a> E-mail: <a href="mailto:sherzad.hamad@su.edu.krd">sherzad.hamad@su.edu.krd</a> E-mail: E-mail :</b>
<b>5. Time (in hours) per week</b>	<b>Theoretical: 2 Practical: 3</b>
<b>6. Office hours</b>	<b>Sunday to Wednesday or make appointment</b>
<b>7. Course code</b>	
<b>8. Teacher's academic profile</b> ➤ ( Dr. Sherzad Omar Hamad)	<b>I completed my B.Sc. in Salahaddin University – Agriculture college – Plant Production Department in 2005. I got M.Sc. in Salahaddin University – Agriculture college – Forestry and Horticulture department in 2010 and my specialize is Silviculture. I completed my PhD. in Universiti Putra Malaysia in 2017. Currently, I am working as Lecturer in Forestry Department - Agriculture college, Salahaddin University.</b>

<p>➤ <b>M. Shilan Abdurrahman Mirsar</b></p>	<ul style="list-style-type: none"> <li>● <b>Date of Birth:</b> 26 January 1978</li> <li>● <b>Place of Birth:</b> Erbil</li> <li>● <b>Nationality:</b> Iraqi</li> <li>● <b>Marital status:</b> Single</li> <li>● <b>Sex:</b> Female</li> </ul> <p><b>Education:</b></p> <ul style="list-style-type: none"> <li>● <b>B.Sc:</b> Plant Production / College of Agriculture (2001-2002) / University of Salahaddin / Kurdistan Region/ Iraq.</li> <li>● <b>M.Sc:</b> Forestry/ Agroforestry/ College of Agriculture (2007) University of Wales, Bangor/ UK</li> </ul> <p><b>Work History:</b></p> <p>(A) College of Agricultural Engineering Sciences , Forestry department/ Salahaddin University-Erbil /Iraq from 2008 until date I have taught:</p> <ol style="list-style-type: none"> <li>1- Forest Plantation (Practical) for Third stage students/ Forestry Department/ Second Semester</li> <li>2- Afforestation (Practical) for Fourth stage students/ Forestry Department/ First Semester</li> <li>3- Agroforestry for Third stage students/ Forestry Department/ First Semester</li> </ol>
<p><b>9. Keywords</b></p>	
<p><b>10. Course overview:</b></p> <p>➤ <b>Theoretical Part:</b></p> <p>Forest plantations are an increasingly important forest resource worldwide. In some countries (Australia, New Zealand, Chile) they already provide the bulk of wood products. By 2050 the total area of plantations is expected to exceed 200 million hectares, and owing to their generally higher productivity than natural forest, for plantations to become the</p>	

main source of wood products globally. Future demand for wood will increasingly be met from forest plantations, so helping to alleviate pressure on remaining natural forests. Successful forest plantations require species well matched with sites, improvement of genetic stock, control of competing vegetation, and attention to thinning and related operations that enhance tree quality and stand growth.

This Course about Forest plantation will take the student through the steps needed for the successful establishment of a woodlot starting with developing a plan for the site through tree planting and maintenance of the Stand.

**Practical Part:**

Forests are the main source of many products and the most important wood as a raw material used in many important industries such as the production a major forest in addition to the benefits of other important preventive regard to the maintenance of soil and water sources, and because of increased population density in the world and the worsening problems of industrial pollution due to emissions from factories, cars and increasing problems climate change, drought and desertification in the world, where forest plantation is one of the most important steps to confront these dangers and increasing plant density and purify air and prevent water and erosion.

**11. Course objective:**

➤ **Theoretical Part:**

1. Introduce students to Forest Plantation concepts, objectives or importance and its historical developments.
2. Enable students to identify the steps of establishing a forest.
3. Students have to get information about site selection for plantation.
4. Students have to understand how to prepare the site for plantation.
5. Students have to know how to choose a species for plantation.
6. Students must learn the technics of tree planting.

7. Students have to know how to care the planted area in order to reach the objectives of forest plantation.

➤ **Practical Part:**

Goal of teaching planting forest trees is practical:

- 1- Familiarity with the student process of tree plantation and tactics.
- 2- Get the most important forest reforestation projects in the province.
- 3- A comparative study of the state of forests in natural and synthetic region.
- 4- Learn how to create windbreaks and selection of tree species suitable for the establishment and the environmental benefits of Governorate.
- 5- How to plant trees in the mountainous and rugged.

**12. Student's obligation**

Students will be asked to prepare research papers on selective topics. There will be classroom discussions and the lecture will give enough background to evaluate problems sets, and different issues discussed throughout the course. To get the best of the course, it is suggested that students attend classes as much as possible, read the required lectures, teacher's notes regularly as all of them are foundations for the course. Try as much as possible to participate in classroom discussions, preparing the assignments given in the course. Using quiz, exams.

In conclusion, the student must attend the classes and prepare themselves for the test, assignment reports, and quizzes.

Practical Part:

The objective is for the student to understand what is plantation and how they can to plant trees by seeds and seedlings?

**13. Forms of teaching**

Different forms of teaching will be used to reach the objectives of the course: 'power point presentations for the head titles, definitions and summary of the lecture; the students can get a copy of a lecture; the white board also be used to clear the figures and meaning of words; to more clear the lectures some animations and videos will be shown. In practical part, the student will be brought to the forest to identify different tree species and collect different type of the seeds, the students also will be brought to the seed lab to know the process of seed testing and familiar with instrument and equipment that use for that purpose.

#### 14. Assessment scheme

Grading: This subject includes theoretical and practical parts

	First exam	Second exam	Quiz, activity and report	Annual average	Final exam	Total
Theoretical part	5	5	5	15	50	
Practical part	12.5	12.5	10	35	0	
				<b>50</b>	<b>50</b>	<b>100</b>

#### 15. Student learning outcome:

##### In Theoretical part:

The students will get the scientific information about Forest Plantation (Reforestation and Afforestation) aspects which include site selection, species selection, site preparation, planting technics and tending treatments. The student also can enhance their knowledge about climatic factors that play important role in development of the forest plantation. The above information

help the students to be able to establish and rehabilitate the forest stand for sustainable timber production and non-wood forest production.

**In Practical Part:**

They understand what is tree plantation? And methods of plantation and they can do plantation in filed or mountains by seeds or seedlings.

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

Burley, J. (2004). *Encyclopaedia of forest sciences*. Academic Press.

Evans, J. (Ed.). (2009). *Planted forests: uses, impacts and sustainability*. Cabi.

Goor, A.Y. Barney.c.w. (1976) *Forest tree planting in arid zone Ronald, USA*.

Masiero, M., Secco, L., Pettenella, D., & Brotto, L. (2015). Standards and guidelines for forest plantation management: A global comparative study. *Forest Policy and Economics*, 53, 29-44.

Shepherd, K. R. (2012). *Plantation silviculture* (Vol. 22). Springer Science & Business Media.

Siyag, P. R. (2013). *Afforestation, Reforestation and Forest Restoration in Arid and Semi-arid Tropics: A Manual of Technology & Management*. Springer Science & Business Media.

Suzuki, K., Ishii, K., Sakurai, S., & Sasaki, S. (Eds.). (2006). *Plantation technology in tropical forest science* (pp. 53-66). Tokyo: Springer.

<b>17. The Topics: Theoretical Topics</b>		<b>Lecturer's name</b>
First week	<ul style="list-style-type: none"> <li>- What is Forest Plantation?</li> <li>- Definition of Forest Plantation and other terms relate with it.</li> <li>- The Advantage and Disadvantages of Forest Plantation.</li> </ul>	<p><b>Assist Prof Dr. Sherzad Omar Hamad</b> <b>(2 hrs)</b></p>
Second week	<p>Forest Plantations Around the World</p> <p>The area of forest plantations around the world</p> <p>Amount of plantation area and usage based on the purpose</p> <p>Deforestation and Afforestation amount in the world</p> <p>The tree species used in plantation</p>	
Third week	<p>Steps of establishing a forest stand</p> <ul style="list-style-type: none"> <li>A. Determining the objectives of the plantation.</li> <li>B. Select and evaluate a site that will be planted.</li> </ul>	
Fourth week	<p>Steps of establishing a forest stand</p> <ul style="list-style-type: none"> <li>C. Select a suitable tree species based on ecological properties of the site.</li> <li>D. Prepare the site for plantation.                             <ul style="list-style-type: none"> <li>➤ Some important points should be known during site preparation.</li> <li>➤ Objectives of site preparation</li> </ul> </li> </ul>	



	<p>➤ Steps of site preparation 1- Eradication of vegetations</p>	
Fifth week	The First Examination.	
Sixth week	<p>Steps of site preparation 2- Cultivation. Advantages of cultivation Disadvantages of cultivation Types of Cultivation Results of Cultivation 3- Pits</p>	
Seventh week	<p>Steps of establishing a forest stand <b>E-</b> Applied tree planting technics (Planting Operation) <b>First: Direct Seed Sowing</b> Where should direct seeding apply? The factors that affect on successes of direct seeding technics Advantages of Direct Seed Sowing Disadvantages of Direct Seed Sowing Methods of Direct Seed Sowing Two general methods of partial seeding are used, planting in strip and spot planting. <b>Second: Field planting (Planted Seedling)</b> Reasons for using seedling to establish a forest stand Advantages of planted seedling: Disadvantages of planted seedling:</p>	

Eighth week	Steps of establishing a forest stand F. Applied Silviculture treatments to improve tree growth.	
Ninth week	The Second Examination.	
Tenth week	<ul style="list-style-type: none"> <li>- Pure forest.</li> <li>- Advantage and disadvantages of pure forest.</li> <li>- Mixed forest.</li> <li>- Advantage and disadvantage of mixed forest.</li> <li>- The rules of mixed forest establishment.</li> </ul> Forms of mixing.	
Eleventh week	Special plantation1	
Twelfth week	Special plantation2	
Thirteenth week	Special plantation3	
Fourteenth week	Special plantation4	
Fifteenth week	Special plantation5	
<b>18. Practical Topics (If there is any)</b> <b>1<sup>st</sup> week:</b> Definition of forest plantation, Afforestation, Reforestation, Deforestation, benefits of tree plantation, Preparing the Planting Site <b>2<sup>nd</sup> week:</b> Types of seedling  1- Bare-root trees 2- Machine-balled		<b>ex: (3 hrs)</b>

3- Balled and burlapped (B & B)

4- Containerized plants:

Technique of Planting

**3<sup>rd</sup> week:** Planting Methods:

- 1- Planting in hole
- 2- Compression method

**Planting methods used in Iraq:**

- 1- Planting in hole
- 2- Crescent-shaped holes
- 3- Gradonies (contour line)
- 4- Terraces

Planting Seasons

Care Before Planting

**4<sup>th</sup> week:** Field project

**5<sup>th</sup> week:** Type of planting

**1- Regular planting**

- a: Square planting
- b: Rectangular planting
- c: Triangular planting

**2- Irregular planting**

**6<sup>th</sup> week:** Scientific Trip to paulownia plantation

<p><b>7<sup>th</sup> week:</b> According to the Deep of planting stocks</p> <ol style="list-style-type: none"> <li>1. Shallow planting</li> <li>2. Normal planting</li> <li>3. Deep planting</li> </ol> <p><b>Forms of mixing species</b></p> <ol style="list-style-type: none"> <li>1- Single tree mixing</li> <li>2- Row mixing</li> <li>3- Strip mixing</li> <li>4- Patch (group) mixing</li> </ol> <p><b>8<sup>th</sup> week:</b> Field project</p> <p><b>9<sup>th</sup> week:</b> Sustaining the Newly Planted Tree (mulching, fertilization, pruning, Staking or guying)</p> <p><b>10<sup>th</sup> week:</b> Sustaining the Newly Planted Tree (watering, trunk protection, transplanting)</p> <p><b>11<sup>th</sup> week:</b> Scientific Trip to Kasnazan</p>	
<p><b>Examination paper 1 (pending confirmation)</b></p>	
<p><b>Examination paper 2 (pending confirmation)</b></p>	
<p><b>Examinations:</b></p> <p><b>In regard to this subject the type of exam will be as follow:</b></p> <p><b>1- Definitions:</b></p>	

**2- Multiple Choose:**

**3- Use true or false for each sentence and correct false statement:**

**4- Fill the following blanks with the correct word:**

**5- Numerous these followings:**

**6- Explain briefly:**

**7- give the reasons of these followings:**

**20. Extra notes:**

**21. Peer review**