

Ministry of Higher Education and Scientific research



Salahaddin University
College of Agriculture
Department of Forestry
Second Stage Students

Course Book: Forest Ecology-Theory & Practice

(Theory part), Lecturer Ph.D. Dr. Zana Abubakr Ahmed Lak

(Practice part) MSc. Assist. Lecturer Rushdy Rokan Aziz

Academic Year: Fall Semester 2024 - 2025

Course Book of (2nd stage forestry)

1. Course name	Forest Ecology - Theory & Practice
2. Lecturer	Ph.D. Dr. Zana Abubakr Ahmed Lak MSc. Rushdy Rokan Aziz
3. Department/ College	Forestry/Agriculture
4. Contact	E-mail: zana.ahmed @su.edu.krd Tel: 07504520548 E-mail: Rushdy.Aziz @su.edu.krd E-mail: rushdyrokan@yahoo.com Tel: 07736963899 / 07504886122
5. Time (hours) per week	Theoretical: 2 hours Practical: 3 hours
6. Office hours Ph.D. Dr. Zana Abubakr Ahmed Lak MSc. Rushdy Rokan Aziz	<i>I often present in my office from Sunday to Thursday. Sunday to Thursday</i>
7. Course code	
8. Lecturer academic profile (Dr. Zana Abubakr Ahmed Lak)	<p>Awarded Ph.D. Forest Ecophysiology, Department of Forest & Soil, Institute of Forest Ecology ,University of Bodenkulture - Vienna, Austria in 2021. Awarded MSc. in Forest Protection, Forestry Department, Agriculture College, University of Salahaddin - Erbil, Kurdistan region government in 2007. Awarded B.Sc plant production college of Agriculture Salahaddin University in 2003. Took baccalaureate, Sheikh Mahmoud Hafid Secondary School in 1999.</p> <p>Demonstrator at the Department of Plant Production, Salahaddin University in 2004.. Assist. Lecturer, Plant Production Department, College of Agriculture, Salahaddin University in 2007 – 2013. Lecturer, Department of Forestry, College of Agriculture , Salahaddin University 2014 – 2022. Teaching staff member (Assistant Lecturer), Plant Production, College of Agriculture, Salahaddin University in 2007 – 2014. (Lecturer), forestry, College of Agriculture, Salahaddin University in 2014 – 2015.</p> <p>Publishing (8) papers in journal, Agri. Sci. Basrah University, Agri. Sci. Journal Kirkuk University, Sci. Jour. Raparen Uni., Journal Plant & Soil Austria, Forests IMDB Journal Switzerland. Participated in Scientific Conference of Plant Protection Beirut-Lebanon (2009). Participated in Scientific Conference of Mediterranean plant Pathology Rome-Italy (2010). Participated in workshop of Compact Desertification, Vienna Austria (2017). Participated in workshop of geo science and satellite data, Vienna (2016). Participated in workshop of mountain Forestry Conservation, Vienna (2018). Participated in workshop of Biodiversity, Vienna (2019).</p>

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(MSc. Rushdy Rokan. Aziz)	I completed my (B.Sc.) in Salahaddin University - Erbil, Iraq – Agriculture College - Department of Plant Production in 2007. I got my (M.Sc.) in Salahaddin University - Erbil, Iraq – Agriculture College - Forestry Department in 2015 and my specialize is Silviculture. I am working as Assist Lecturer in Salahaddin University, Erbil, Iraq – Agriculture College, Forestry Department in 2016.
9. Keywords	Ecology, Forest Ecology, Forest Services. Plant physiology
10. Course overview: ➤ Theoretical Part: <p>This Course is about Forest Ecology. It is one of the most important branches of ecological science that studies the relationship between organisms and their environment in a forest. Forest ecology most often concentrates on the level of the population, community or ecosystem. Soundly, trees are an important component of forest research, but the wide diversity of other life forms and abiotic components in most forests means that other elements, such as wildlife or soil nutrients, are often the significant point. The course will give an understanding of the structure, dynamics and function of forest ecosystems and the relationships between abiotic and biotic factors.</p> ➤ Practical Part: <p>As its subtitle implies, the aim of this subject is to provide within a relatively small compass an account of the structure of forests. The relationships between the main groupings of organisms which live within them, and a discussion of the significance of plant and animal diversity at both the community and regional level. There is highlighting on forest processes, especially those involving the flow of energy and cycling of nutrients. An attempt has also been made to show how communities dominated by trees, together with their constituent animals and plants, have gradually evolved during geological time. To understanding of the fundamental concepts of the main biotic factors effect on growth of trees and forest development. The main sound knowledge of the major areas of are included forest development , plant life forms and biological spectra, Light and shade, Water, Temperature and pollutant influences on tree growth, Altitudinal zonation and timberlines, and Ecology of mature and over mature trees.</p>	
11. Course objective: ➤ Theoretical Part: <p>The main objectives of forest ecology are: to teach students the different field of ecology and the application of forest ecology in controlling soil erosion, reforestation, restoration of natural resources and distribution of vegetation in many regions.</p> ➤ Practical Part: <p>Taking a functional rather than an ecosystem about forests, This subject provides a brief account of the structure of woodlands and forests. Using examples from around different locations of Erbil provenance from Centre to mountain areas of forests. The course explains tree classification to their requirement to different abiotic factors such as water, light etc., and the structure of the forest soil and the roots system; how the main groups of organisms that live within them interact both positively and negatively. There is particular emphasis</p>	

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on woodland and forest processes, especially those involving the flow and cycling of nutrients, as well as the dynamics of wooded areas, considering how and why they have changed through geological time and continue to do so. This clear, non-technical text will be of interest to undergraduates, foresters, ecologists. Forest Ecology is a most important science because it is directly linked to human life. The goal of this subject itself as linked to climate factors closely linked with tree growth, because of that we need to measure climate elements during planting any plants.

12. Student's obligation

➤ Theoretical Part:

Students are required to attend at the class and carried out two exams in the semester in Forest Ecology theoretical part.

➤ Practical Part:

Students will be asked to make Project. In Forest Ecology during the course and present the result and paper to discuss it in the class. There will be classroom discussions and the lecture will give enough background to evaluate problems sets, and different issues discussed throughout the course. Students are required to conduct two exams in fall semester in Forest Ecology practical part.

13. Forms of teaching

➤ Theoretical & Practical Part:

Direct method following for teaching with student. All lectures will be explained by using PPT. software with connecting to projector. White board will be used for more explanation. A copy of hand out will give to the students to write their notes.

14. Assessment scheme

➤ Theoretical Part:

Quiz will be conducted every lectures with giving 5 minutes to the students. The sum of two exams will be out of (10) marks and (5) marks for Actives and quizzes. The final exam will be out of (50) marks.

First Exam	Second Exam	Annual Average	Final Exam	
7.5	7.5	15	50	Theory part

➤ Practical Part:

They also require bringing a report in this semester. All students should be presented in the lab. Quiz will be conducted every lectures with giving 5 minutes to the students. The sum of two exams will be out of (30) marks and (5) marks for Actives' for practical part with general total (35) marks. There is no final exam .

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First Exam	Second Exam	Quiz,activity and Report	Annual Average	Final Exam	
15	15	5	35	No Exam	Practice part

5. Student learning outcome:

➤ **Theoretical & Practical Part:**

The student should get the scientific information about forest ecology. The student should learn the effect of biotic and abiotic elements on the growth and establish of tree forest as well as the effect of tree forests on the controlling climate change, water and nutrient cycles, soil erosion, and wildlife. The main sound knowledge of the major areas of are included forest development , plant life forms and biological spectra, Light and shade, Water, Temperature and pollutant influences on tree growth, Altitudinal zonation and timberlines, and Ecology of mature and over mature trees.

16. Course Reading List and References:

Kimmins,J.P. (2004) forest ecology. Prentic Hall. New jersey

Robert and R.Gara.(2011) Forest health. Wave land press Illinois.

Shukla R. and chand& company LTD.

Thomas, P., & Packham, J. (2007). Ecology of woodlands and forests: description, dynamics and diversity. Cambridge University Press.

Hytteborn, H., & Verwijst, T. (2011). The importance of gaps and dwarf trees in the regeneration of Swedish spruce forests: the origin and content of Sernander's (1936) gap dynamics theory. Scandinavian Journal of Forest Research, 26(S10), 3-16.

Fuentes, M., Niklasson, M., Drobyshv, I., & Karlsson, M. (2010). Tree mortality in a semi-natural beech forest in SW Sweden. Ecological Bulletins, 53, 117-129.

E. Röhrig, N. Bartsch (2016). Waldökologie: Einführung für mitteleuropa. Springer,Germany, Berlin.

17. Theoretical Topics

Lecturer's name

**Dr. Zana Abubakr
Ahmed Lak**

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<p>Week 1: Ecology:</p> <p>Definitions, Different fields of ecology, and Application of forest ecology, forests of the world</p> <p>Week 2: Climatic factors: Light</p> <p>Light, Visible spectrum, Albedo, effect of light on forest, Great and net production.</p> <p>Week 3: Climatic factors: Temperature</p> <p>Temperature, climate energy source, temperature and forest ecophysiology, tree tolerance to temperature.</p> <p>Week 4: Climatic factors: Precipitation</p> <p>Water in tree life, soil water, forest canopy, leaf evapotranspiration, Soil Infiltration, Canopy interception.</p> <p>Week 5: Soil carbon and Nutrient Cycling</p> <p>Forest soil, Nutrients in tree life, root activity, Organic matter, decomposition and nutrient cycling.</p> <p>Week 6: Physiographic factors</p> <p>Effect of Altitude and Fronts on forest growth</p> <p>Week 7: Forest Ecosystem</p> <p>Definition, structure of forest Ecosystem, component of ecosystem and function of ecosystem.</p> <p>Week 8: Autecology and synecology</p> <p>Definitions, Ecological life history of species, Ecotypes. The characteristics of ecotypes Formation and origin of new ecotypes.</p> <p>Week 9: Forest ecology and Biotic factors:</p> <p>Interaction between tree growing in a community and man, animal and plants micro-organism.</p> <p>Week 10-12:</p> <p>Climate Change, Impact of climate change on forest.</p> <p>Practical Topics</p> <p>Week: 1 (3hr) Meteorology</p>	<p>(2 hrs)</p> <p>MSc. Rushdy Rokan Aziz (3 hrs)</p>
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Week: 2 (3hr) project experiment set up.

Week: 3 ; (2hr) Light +(1hr) experiment fertilizer treatment

Week: 4 ; (2hr) Temperature +(1hr) experiment fertilizer treatment

Week: 5; (2hr) Precipitation +(1hr) experiment fertilizer treatment

Week: 6 ; (1hr) *First Examination* +(2hr) experiment fertilizer treatment

Week: 7 (3hr) experiment harvest

Week: 8 (3hr) experiment harvest

Week: 9 (full day) Visit Safeen mountain natural forest.

Week: 8 (3hr) Wind

Week: 9 (3hr) Forest soil and nutrients

Week: 10 (3hr) project experiment presentations & Discussions

Week: 11 (3hr) project experiment presentations & Discussions

Week: 12 (1hr) *Second Examination*

18. Examinations:

➤ Theoretical Part:

- 1-Definitions.
- 2- Multiple choices.
- 3- Correct the underlined parts if they are falls.
- 4- Write the reason to the following statements.

➤ Practical Part:

Type of examination Questions:

1-Define the following terms. (Wind – Meteorology – Climate - Forest fire)

Forest fire: is a fire that spread freedom and burning weeds, bushes, shrubs and terrestrial algae.

2- Multiple choices

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This medium consists of layer of solid rock of the earth. (Pedosphere, Atmosphere, Lithosphere)

Lithosphere

3- Correct the underlined parts if they are falls:

Plants utilize (0.2 - 0.2%) of moisture that is taken from ground in the construction processes.

False (0.1-0.3 %).

4- Answer the True or False to the following.

-Plants utilize of visible light in photosynthesis process especially blue and green color.

-If photosynthesis ratio is equal to respiration ratio, plant growth will occur.

5- Fill the blanks with suitable words: -

Maximum temperature is the temperature that stop physiology phenomenon which is between C°

40 - 50 C°

6- Answer the following

1-Why consider the maximum moisture is danger for trees and plants ?

2- Differences between calm wind and storm wind.

3- Enumerate the most important causes to forest fire. (Only 5)

7- Write Scientific name for each of the following. (Only Tow example)

-Tolerant trees to shade

Tilia spp

Thuja occidentalis

20. Extra notes:

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to en the course book with his/her valuable remarks.

21. Peer review: پیدا چوونہ وہی ہاوہن

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This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book 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 professor, assistant professor, a lecturer or an expert in the field of your subject).

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