

# Far Western University Faculty of Science and Technology

Course Title: Botany VI (Environment and Biodiversity)

Course No.: BOT 362

Nature of the Course: Theory Level: B.Sc., Year: Third

Semester: Sixth

Full Marks: 100 Pass Marks: 45

Credit: 3

Number of hours/week: 3

Total Hours: 45

#### 1. Course Description

The course intends to provide theoretical and practical knowledge on environment and biodiversity. The course has been parted into two units. The first unit deals with environment and the second unit deals with biodiversity.

#### 2. Course Objectives

The general objectives of the course are as follows:

- To develop fundamental knowledge on different aspects of environment.
- To develop fundamental knowledge on different aspects of biodiversity.

#### 3. Specific Objectives and Contents

# • Discussion on overview of the components of environment, global water distribution, soil profile and importance of soil to the biosphere, concept of world biomes.

- Conceptualization of mountain environment and environmental issues in mountains.
- Discussion on environmental issues.
- Conceptualization of natural resources, effect of anthropogenic activity on ecosystems, role of plants in resource conservation.
- Conceptualization of EIA process, environmental legislation.

#### Contents

## Unit I: Environment (F.M. 50) (22.5 hours)

- **1.1 Introduction:** Concept, structure, composition and importance of the atmosphere; hydrosphere, global distribution of water; lithosphere, soil formation and soil profile; biosphere, concept of biomes [4 hrs.]
- 1.2 Mountain environment: Concept: topography, mountain climate, vertical thermal layers of atmosphere, altitude and pressure, precipitation, wind, radiation, soil, microclimate; stability and instability; Mountain bazards: earthquake, avalanche, landslide, climate change, deforestation [5.5 hrs.]
- 1.3 Environmental Issues: Human population; land use land cover change; urbanization; pesticide and chemical fertilizers (use and abuse); food security and water security [4 hrs.]
- 1.4 Natural Resource Management: Renewable and non-renewable energy resources; reduction in ecosystem complexity and diversity; Ecosystem services: concept and categories; environmental indicators: role of plants in environmental monitoring, bioengineering [4 hrs.]



M.

- 1.5 Environmental Impact Assessment (EIA) and Environmental Affairs: Origin and development of EIA; IEE and EIA process, A case study from Nepal; environmental organizations; environmental legislations; environmental education [5 hrs.]
- Discussion on concept and distribution of biodiversity and their status.
- Discussion on different aspects of mountain biodiversity with reference to Nepal.
- Discussion on factors of biodiversity loss.
- Conceptualization of conservation and management of biodiversity.
- Discussion of Ethnobotany and biodiversity policy and legislation.

Unit II: Biodiversity (F.M. 50) (22.5 hours)

- 2.1 Biodiversity overview: Concept and levels; global distribution of plant biodiversity richness; biodiversity hotspots; status of biodiversity in Nepal; important institutions/centers of biodiversity study (herbarium, museum, botanical gardens) [4hrs.]
- 2.2 Mountain biodiversity: Concept of mountain biodiversity (components of mountain biodiversity, endemism); mountain vegetation: forest, grasslands and tree-line, forest types of Nepal, pattern of species richness along elevation gradient; agrobiodiversity (components, significance); medicinal and aromatic plants: status and distribution in Nepal; wetlands: concept of wetland, components of wetland biodiversity and significance, major wetlands and Ramsar sites in Nepal (introduction and significance) [6.5 hrs.]
- 2.3 Loss of biodiversity: Drivers of biodiversity loss; species extinction; threatened species (the IUCN Red List categories) [3 hrs.]
- 2.4 Conservation and Management of Biodiversity:
  Concept of wildlife management; current practices in conservation (in situ, ex situ, sacred groves and cryopreservation); protected areas network and connectivity; park-people conflict; participatory community approach of biodiversity conservation [5 hrs.]
- 2.5 Biodiversity inventory and legislation:
  Ethnobotany: introduction and scope;
  bioprospecting and biopiracy of traditional
  knowledge; major strategies of biodiversity
  conservation and salient features of CBD, CITES;
  Intellectual Property Rights (IPRs) [4 hrs.]

Note: Numbers given in parenthesis after each unit indicate full marks and instruction hours respectively.

**Instructional Techniques** 

All topics are discussed with emphasis on real-world application. List of instructional techniques is as follows:

Lecture and Discussion

M



- Group work and Individual work
- Self-study
- Assignments
- Presentation by Students
- Term Paper writing
- Quizzes

#### **Evaluation**

External Evaluation	Marks	Internal Evaluation	Weight	Marks	Practical	Weight age	Marl
End semester examination	60	Assignments &  Presentation	20%	20	Practical Report copy	25%	
(Details are given in the separate table at the end)		Quizzes	10%		Viva	25%	20
		Attendance	20%		Practical Exam	50%	20
		Internal Exams	50%				
Total External Full Marks 60+20+2	60	Total Internal	100%	20		100%	20

Attendance in Class: Students should regularly attend and participate in discussions in the class. 90% class attendance is mandatory for the students to enable them to appear in the End-Term examination. Below 80% in attendances that signify as NOT QUALIFIED (NQ) in subject to attend the end term examination.

**Assignment:** Each student must submit the assignment individually. The stipulated time for submission of the assignment will be seriously taken as one of the major criteria of the evaluation.

**Mid-Term Examinations:** It is a written examination and the questions will be set covering the topics as taught in the sessions. Mid-term examination will be based on the model prescribed for End-term examination.





End-Term/External Examinations: It is also a written examination and the questions will be set covering all the topics in the session of the course. The question model, full marks, time and others will

Full Marks: 100, Pass Marks: 45, Time: 3 Hrs

Nature of Question	Total Questions to be asked	Total Questions to be answered	Total Marks	Weight age	External exam weightag
Group A: Very short type questions	8	8	8×3=24	24%	e at 60%
Group B: Short Answer type Questions		5	5×8=40	40%	24
Group C: Long Answer type Questions	4	3	3×12=36	36%	21.6
			100	100%	60%

Note: Out of total 100 marks, weightage (marks) carried by each unit will be as indicated in the table

Strict Notice: Each student must secure 50% marks with 80% attendance in internal evaluation in order to qualify for the End-Term Examinations. Failing to get such score will be given NOT QUALIFIED (NQ) and the student will not be eligible to appear in the End-Term examinations.

#### **Prescribed Texts**

- 1. Asthana DK and Asthana M. 2005. Environment: Problems and Solutions. S. Chand & Co.
- 2. Chaudhary RP. 1998. Biodiversity in Nepal Status and Conservation. S. Devi Saharanpur,
- 3. Rana SVS. 2010. Essentials of Ecology and Environmental Science. PHI Learning Pvt. Ltd.
- 4. Lekhak HD and Lekhak B. 2009. Natural Resource Conservation and Sustainable Development in Nepal. Kshitiz Publication, Kathmandu
- 5. Groombridge B (ed.). 1992. Global Biodiversity Status of Earth's Living Resources.
- 6. Jha PK et al. 2008. Medicinal Plants in Nepal. Ecological Society (ECOS), Kathmandu, Nepal
- 7. Jha, P.K., F.P. Neupane, M.L. Shrestha and I.P. Khanal. 2013. Environment and Natural Resources (Nepalpedia series No 1). Publ. Nepal Academy of Science and Technology
- 8. Jha PK, Neupane FP, Shrestha ML and Khanal IP (eds.). 2013. Biological Diversity and Conservation. Nepalpedia Series No. 2. Publ. Nepal Academy of Science and Technology

9. Uprety B. 2003. Environmental Impact Assessment: Process and Pactice. Mrs. Uttara Uprety,

10. Martin G. 1995. *Ethnobotany* – a Methods Manual. Chapman and Hall.

11. Miller GT and Spoolman S. 2007. Environmental Science: Problems, Connections and

12. Station JDA. 1972. Forests of Nepal. John Murray, London.

W. W.

# Far Western University Faculty of Science and Technology

Course Title: Botany VI (Environment and Biodiversity)

Course No.: BOT 362

Nature of the Course: Theory Level: B.Sc., Year: Third

Semester: Sixth

Full Marks: 100 Pass Marks: 45

Credit: 3
Number of hours/week: 3

Total Hours: 45

#### 1. Course Description

The course intends to provide theoretical and practical knowledge on environment and biodiversity. The course has been parted into two units. The first unit deals with environment and the second unit deals with biodiversity.

#### 2. Course Objectives

The general objectives of the course are as follows:

- To develop fundamental knowledge on different aspects of environment.
- To develop fundamental knowledge on different aspects of biodiversity.

### 3. Specific Objectives and Contents

# • Discussion on overview of the components of environment, global water distribution, soil profile and importance of soil to the biosphere, concept of world biomes.

- Conceptualization of mountain environment and environmental issues in mountains.
- Discussion on environmental issues.
- Conceptualization of natural resources, effect of anthropogenic activity on ecosystems, role of plants in resource conservation.
- Conceptualization of EIA process, environmental legislation.

#### Contents

## Unit I: Environment (F.M. 50) (22.5 hours)

- 1.1 Introduction: Concept, structure, composition and importance of the atmosphere; hydrosphere, global distribution of water; lithosphere, soil formation and soil profile; biosphere, concept of biomes [4 hrs.]
- 1.2 Mountain environment: Concept: topography, mountain climate, vertical thermal layers of atmosphere, altitude and pressure, precipitation, wind, radiation, soil, microclimate; stability and instability; Mountain bazards: earthquake, avalanche, landslide, climate change, deforestation [5.5 hrs.]
- 1.3 Environmental Issues: Human population; land use land cover change; urbanization; pesticide and chemical fertilizers (use and abuse); food security and water security [4 hrs.]
- 1.4 Natural Resource Management: Renewable and non-renewable energy resources; reduction in ecosystem complexity and diversity; Ecosystem services: concept and categories; environmental indicators: role of plants in environmental monitoring, bioengineering [4 hrs.]





- Discussion on concept and distribution of biodiversity and their status.
- Discussion on different aspects of mountain biodiversity with reference to Nepal.
- Discussion on factors of biodiversity loss.
- Conceptualization of conservation and management of biodiversity.
- Discussion of Ethnobotany and biodiversity policy and legislation.

1.5 Environmental Impact Assessment (EIA) and Environmental Affairs: Origin and development of EIA; IEE and EIA process, A case study from Nepal; environmental organizations; environmental legislations; environmental education [5 hrs.]

Unit II: Biodiversity (F.M. 50) (22.5 hours)

- 2.1 Biodiversity overview: Concept and levels; global distribution of plant biodiversity richness; biodiversity hotspots; status of biodiversity in Nepal: important institutions/centers biodiversity study (herbarium, museum, botanical gardens) [4hrs.]
- 2.2 Mountain biodiversity: Concept of mountain biodiversity (components of mountain biodiversity, endemism); mountain vegetation: forest, grasslands and tree-line, forest types of Nepal, pattern of species richness along elevation gradient; agrobiodiversity (components, significance); medicinal and aromatic plants: status and distribution in Nepal; wetlands: concept of wetland, components of wetland biodiversity and significance, major wetlands and Ramsar sites in Nepal (introduction and significance) [6.5 hrs.]
- 2.3 Loss of biodiversity: Drivers of biodiversity loss; species extinction; threatened species (the IUCN Red List categories) [3 hrs.]
- 2.4 Conservation and Management of Biodiversity: Concept of wildlife management; current practices in conservation (in situ, ex situ, sacred groves and cryopreservation); protected areas network and connectivity; park-people conflict; participatory community approach of biodiversity conservation [5 hrs.]
- 2.5 Biodiversity inventory and legislation: Ethnobotany: introduction and bioprospecting and biopiracy of traditional scope; knowledge; major strategies of biodiversity conservation and salient features of CBD, CITES;

Note: Numbers given in parenthesis after each unit indicate full marks and instruction hours respectively. Intellectual Property Rights (IPRs) [4 hrs.]

## **Instructional Techniques**

All topics are discussed with emphasis on real-world application. List of instructional techniques is as

Lecture and Discussion





- Group work and Individual work
- Self-study
- Assignments
- Presentation by Students
- Term Paper writing
- Quizzes

#### Evaluation

External Evaluation	Marks	Internal Evaluation	Weight	Marks	Practical	Weight age	Marl
End semester examination		Assignments & Presentation	20%		Practical Report copy	25%	
(Details are given in the separate table at the end)	60	Quizzes	10%	20	Viva	25%	20
		Attendance	20%		Practical Exam	50%	,
		Internal Exams	50%				
Total External	60	Total Internal	100%	20		100%	20

Attendance in Class: Students should regularly attend and participate in discussions in the class. 90% class attendance is mandatory for the students to enable them to appear in the End-Term examination. Below 80% in attendances that signify as NOT QUALIFIED (NQ) in subject to attend the end term examination.

**Assignment:** Each student must submit the assignment individually. The stipulated time for submission of the assignment will be seriously taken as one of the major criteria of the evaluation.

**Mid-Term Examinations:** It is a written examination and the questions will be set covering the topics as taught in the sessions. Mid-term examination will be based on the model prescribed for End-term examination.





End-Term/External Examinations: It is also a written examination and the questions will be set covering all the topics in the session of the course. The question model, full marks, time and others will

Full Marks: 100, Pass Marks: 45, Time: 3 Hrs

Nature of Question	Total Questions to be asked	Total Questions to be answered	Total Marks	Weight age	External exam weightag
Group A: Very	8	8	8×3=24	2407	e at 60%
short type questions			0.73-24	24%	14.4
Group B: Short	6	5			
Answer type Questions			5×8=40	40%	24
Group C: Long	4	3			
Answer type Questions		3	3×12=36	36%	21.6
			100	100%	60%

Note: Out of total 100 marks, weightage (marks) carried by each unit will be as indicated in the table

Strict Notice: Each student must secure 50% marks with 80% attendance in internal evaluation in order to qualify for the End-Term Examinations. Failing to get such score will be given NOT QUALIFIED (NQ) and the student will not be eligible to appear in the End-Term examinations.

#### **Prescribed Texts**

- 1. Asthana DK and Asthana M. 2005. Environment: Problems and Solutions. S. Chand & Co.
- 2. Chaudhary RP. 1998. Biodiversity in Nepal Status and Conservation. S. Devi Saharanpur,
- 3. Rana SVS. 2010. Essentials of Ecology and Environmental Science. PHI Learning Pvt. Ltd.
- 4. Lekhak HD and Lekhak B. 2009. Natural Resource Conservation and Sustainable Development in Nepal. Kshitiz Publication, Kathmandu
- 5. Groombridge B (ed.). 1992. Global Biodiversity Status of Earth's Living Resources.
- 6. Jha PK et al. 2008. Medicinal Plants in Nepal. Ecological Society (ECOS), Kathmandu, Nepal
- 7. Jha, P.K., F.P. Neupane, M.L. Shrestha and I.P. Khanal. 2013. Environment and Natural Resources (Nepalpedia series No 1). Publ. Nepal Academy of Science and Technology
- 8. Jha PK, Neupane FP, Shrestha ML and Khanal IP (eds.). 2013. Biological Diversity and Conservation. Nepalpedia Series No. 2. Publ. Nepal Academy of Science and Technology

9. Uprety B. 2003. Environmental Impact Assessment: Process and Pactice. Mrs. Uttara Uprety,

10. Martin G. 1995. Ethnobotany – a Methods Manual. Chapman and Hall.

11. Miller GT and Spoolman S. 2007. Environmental Science: Problems, Connections and

12. Station JDA. 1972. Forests of Nepal. John Murray, London.