

Forth Year (1st Semester)/Semester VII

FPU 501: Project Management and Enterprise Development

Course number	Course title	Credit hours
FPU 501	Project Management and Enterprise Development	3 (3+0)

SCOPE

This course covers the basic concept of project management and enterprise development including the principles and practices. It exposes students with the approaches and challenges of project management and enterprise development using an example of Nepal as case study. The teaching style of the course will include both a combination of classroom learning, field and group works.

OBJECTIVES

- Understand basic concepts of project management and enterprise development
- Understand the importance of project planning, implementation and monitoring
- Understand the concept of enterprise and entrepreneurship
- Understand the importance of enterprise development in national economic development
- Gain skills in developing a project document of forestry related enterprise

EXPECTED OUTCOMES

Upon the completion of the course, students will be able to develop understanding about the concept of a project management and gain skills to formulate a forestry related project focusing to enterprise.

COURSE DESCRIPTION

UNIT 1. UNDESTANDING PROJECT AND PROJECT MANGEMENT (8)

- 1.1 Definition of Project and Project management
- 1.2 Types of Projects
- 1.3 Project ionization Approach
- 1.4 Project cycle
- 1.5 Project manager and its' role
- 1.6 Components of project management

UNIT 2. PROJECT PLANNING, IMPLEMENTATION AND MONITORING (7)

- 2.1 Concept and Importance
- 2.2 Project Planning (Planning process, Planning period, Responsibility delegation)
- 2.3 Project Implementation (Implementation approaches,
- 2.4 Project Monitoring (Monitoring concept, Indicators)

UNIT 3. PROJECT BUDGETING AND ACCOUNTING (7)

- 3.1 Concept and importance
- 3.2 Budget Estimation and Formulation
- 3.3 Book of Accounts
- 3.4 Fund management and administration

UNIT 4. HUMAN RESOURCE MANAGEMENT AND DEVELOPMENT (8)

- 4.1 Meaning and Objectives

- 4.2 Recruitment and Selection
- 4.3 Staffing structure
- 4.4 Staff security and welfare (Leave, retirement, pension & gratuity)
- 4.5 Staff development and incentives (Training, promotion, punishment)
- 4.6 Challenges

UNIT 5. ENTERPRISE DEVELOPMENT (7)

- 5.1 Definition
- 5.2 Types of Enterprise Development
- 5.3 Enterprise development and Entrepreneurship
- 5.4 Importance of Enterprises on national economic development
- 5.5 Enterprise Policy and Legal Requirements

UNIT 6. FEASIBILITY ASSESSMENT OF ENTERPRISES (8)

- 6.1 Feasibility concepts and importance
- 6.2 Parameters of feasibility assessment
- 6.3 Legal and institutional feasibility
- 6.4 Financial feasibility
- 6.5 Technical feasibility
- 6.6 Market Feasibility

REFERENCES

1. Baporikar, N. 2018. Entrepreneurship Development and Project Management: Fourth. Edition. Himalaya Publishing House.
2. Gupta, N. and Gupta, A. 2015. Entrepreneurship Development and Project Management Paperback
3. Cusworth J. W and T. R. Franks 1993. Managing Projects in Developing Countries. Routledge

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WPM 502: Protected Area and Landscape Management

Course number	Course title	Credit hours
WPM 502	Protected Area and Landscape Management	3 (3 + 0)

SCOPE

This course offers a basic understanding of a protected area system leading to the broader landscape level perspective of integrated community-based biodiversity conservation in modern protected area planning and management in reference to the context of Nepal

OBJECTIVES

- Understand different concepts and approaches of establishing protected areas for biodiversity conservation and management.
- Familiarize with the policies and multilateral environmental agreements concerning biodiversity conservation and protected area management.
- Understand the human dimensions in biodiversity conservation and apply management skills to resolve park-people conflicts and address local needs.
- Understand the diverse approaches and the significance of corridors, connectivity and landscape level to protected area management.
- Apply the principles and appropriate tools in preparing modern and holistic management plan of protected areas.

EXPECTED OUTCOMES

Upon completion of this course the students are expected to demonstrate skills in the art and science of protected area design, planning and management practiced under different approaches and levels. In addition, students demonstrate knowledge of policies related to human dimensions of biodiversity conservation and skill in human wildlife conflict management at the local and landscape level.

COURSE DESCRIPTION

UNIT 1: INTRODUCTION (5)

- 1.1. Concept and significance of biodiversity and protected areas
- 1.2. History of Protected Area management (global and Nepalese context)
- 1.3. WHS, Biosphere reserve, NP, WR, HR, CA, BZ, Ramsar sites, International Bird Areas, Protected Forests, etc
- 1.4. Biodiversity conservation outside the protected areas
- 1.5. Why biological corridors and a landscape approach?
- 1.6. Biodiversity, ecosystem services and poverty alleviation

UNIT 2: PROTECTED AREA (PA) DESIGN AND MANAGEMENT APPROACHES (7)

- 2.1. Classification and extent of PA coverage (regional and Nepal)
- 2.2. Protected Area categories and systems (Global, regional and Nepal) and their significance
- 2.3. International and national criteria, guidelines, categories and practices for PA design
- 2.4. Island Biogeography theory and Metapopulation theory applications in PA design
- 2.5. PA and integrated community development models
- 2.6. Buffer zone and conservation area design and management models

UNIT 3. LANDSCAPE ECOLOGY OF BIODIVERSITY CONSERVATION (10)

- 3.1 LANDSCAPE ECOLOGY

- Why biological corridors and a landscape approach?
 - Levels of conservation: biome, ecoregion, landscape, protected areas, ecosystem, corridors and connectivity
 - Landscape ecology approach in mainstreaming biodiversity
 - Global and Nepalese approaches/models of landscape conservation
 - Major biological corridors and landscape conservation complexes in Nepal
 - Biodiversity and livelihood benefits of landscape conservation
 - Case study: Landscape structure and dispersal of mammals (Biome health project)
- 3.2 MANAGING LANDSCAPES FOR WILDLIFE

- Managing Forest for wildlife
- Managing Rangeland/Grassland for wildlife
- Managing Agroecological Farmlands for wildlife
- Managing Wetland and Waterbodies for wildlife
- Managing Urban Environment and Forests for wildlife
- Managing Zoological and Botanical Gardens for wildlife
- Managing linear infrastructure safeguarding nature
- Managing Transboundary landscapes

UNIT 4: POLICIES AND MULTILATERAL ENVIRONMENTAL AGREEMENTS (6)

- 4.1. Salient features of global and regional conventions and treaties (CITES, CITESMIKE, CBD, IUCN, RAMSAR, GTF, GTI, UNESCO World Heritage Convention, conservation strategy, MEA, South Asian Wildlife Enforcement Network(SAWEN), Asian Protected Areas Partnership(APAP))
- 4.2. National level strategies: NBS/NBSAP, All species action plans
- 4.3. Protected areas and the Sustainable Development Goals (2030 Agenda for Sustainable Development)

UNIT 5. HUMAN WILDLIFE INTERFACE MANAGEMENT (9)

5.1 HUMAN WILDLIFE CONFLICT

- Human dimensions of wildlife conservation
- Theory and principle of human-wildlife conflict
- Different incidents of human-wildlife conflict
- Retaliation against wildlife damage
- Governance of PA
- Measurements of conflict scenarios (crop, livestock and property damage assessment)

5.2 HUMAN-WILDLIFE CONFLICT MITIGATION AND MANAGEMENT APPROACHES

- Identification of causes and consequences of human wildlife conflict
- Declaration of BZ, conservation areas, community forests
- Monitoring of wildlife damages and damages to wildlife (real time satellite, GPS, remote camera, etc) and poachers activities (APU, CBAPU, smart patrolling, etc)
- Compensation schemes for wildlife damages in Nepal
- Measures to curb poaching (role of the army, community based anti-poaching operations, park-based anti-poaching units, wildlife crime investigation)
- Conservation education and public relations
- Community involvement and engagement in PA planning and management

UNIT 6: PLANNING AND SUSTAINABILITY OF PA MANAGEMENT (8)

6.1 MANAGEMENT PLAN OF PA

- Global and national strategies for conservation

- Planning models: conventional and modern planning
 - Components of a PA plan (core, bufferzone, tourism, visitor, species, habitat, etc)
 - Levels of a PA plan (Management plan, strategy plan, action plan, site plan, etc)
 - The PA planning tools: LFA, APPA, GIS, GPS, Remote Sensing, Results based, etc
 - Procedures for preparation of management plan of PAs in Nepal
 - PA planning case study: CNP, ACAP, Kanchenjunga CA, Ramsar Wetland site, etc
 - Management effectiveness of protected areas
- 6.2 SUSTAINABILITY OF PA (MONEY and FINANCE)

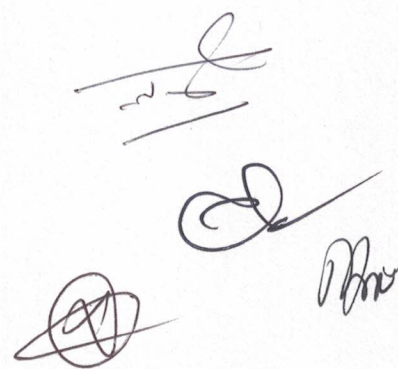
- Recreation and tourism in Protected Area
- Local benefits – khar khadai, grazing, collection of products, etc
- Park entry fees, conservation fees, royalty and concessions
- Conservation trust funds and insurance investment
- Wildlife rescue, orphanage management, veterinary services and vaccinations
- Wildlife farming
- Captive breeding of endangered species
- Protected area visitor centers
- Natural history, wildlife, cultural and historical museums
- Biodiversity financing (Biofin)
- Financing and sustainability of the PA and ecosystem services
- Cooperation of national and international organizations

REFERENCES

1. Bennett A. F., (1999). Linkages in the landscape: The role of corridors and connectivity in Wildlife Conservation. IUCN.
2. DNPWC 2018. Protected Areas of Nepal. Published by DNPWC, Kathmandu 2074
3. Forest, National Parks, Soil Conservation, Environment and Endangered Wildlife related Acts and Regulations compilation, Law Books Mgmt Committee, Kathmandu 2074
4. GoN (2014). Nepal National Biodiversity Strategy and Action Plan 2014-2020. MFSC
5. GoN (2015). Terai Arc Landscape-Nepal 2015. MFSC, Nepal
6. Hawkins et al. 2008. Evaluating effectiveness: a framework for assessing management effectiveness of protected areas 2nd ed. WCPA Best Practice PA Guideline series 14.
7. ICIMOD and MOEST, 2007. Nepal Biodiversity Resource Book: Protected Areas, Ramsar Sites and World Heritage Sites. ICIMOD and Ministry of Environment, Science and Technology (MOEST), UNEP.
8. IUCN, 2008: Guidelines for applying protected area management categories. Edited by Nigel Dudley. IUCN Switzerland
9. Kalemani J., Mulongoy Staurt C. (2004). Protected areas and Biodiversity. UNEP, WCMC.
10. Lakhey S.P. (2003). Wildlife and Protected Area Management. Kathmandu
11. Lockwood, M., Kothari, A., McNeely J.A. (2003). Protected Areas, Poverty & Sustainable Development, IUCN.
12. Lockwood, M., Worboys, G. L., Kothari, A., 2006. Managing Protected Areas: A global guide. Earthscan.
13. McKinnon, J., McKinnon, K., Child, G., and Thorsell, J. (1986). Managing protected areas in the tropics. IUCN (Reprint Natraj publishers, Dehradun)
14. Mulder, M.B. and Coppolillo, P. (2005). Conservation: Linking Ecology, Economics, and Culture. Princeton University Press, Princeton, New Jersey.

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WPM 503: IT Application in Forestry and Wildlife Management

Course number	Course title	Credit hours
WPM 503	IT Application in Forestry and Wildlife Management	3 (2 + 1)

SCOPE

This course provides students with basic skills in various technologies and applications for forest and wildlife management. The course will have a national focus and provide both theoretical and practical aspects.

OBJECTIVES

- Familiarize the student with emerging technologies for wildlife and forest management
- Acquire knowledge and skill and use modern technologies in forest and wildlife management practices
- Increase the working efficiency of forest and wildlife management in the changing context
- Familiarize with the use of artificial intelligence in forest and wildlife management
- Learn basic computer programming knowledge and use it in data analysis

EXPECTED OUTCOMES

Upon completing the course, students acquire knowledge and skills on using emerging technology used in forest and wildlife management.

COURSE DESCRIPTION

UNIT 1: OVERVIEW OF TECHNOLOGICAL ADVANCEMENTS AND THEIR USE IN FORESTRY AND WILDLIFE (4)

- 1.1 Advancement of information technology in the 21st century
- 1.2 Cross-sectoral collaboration for technology development and utilization
 - Technology transfer to the third world
 - Technology and ethics

UNIT 2 FORESTRY-SPECIFIC TECHNOLOGIES (8)

- 2.1 Planation and fencing technologies
- 2.2 Smart nursery, tissue culture, hydroponics, and other emerging technologies
- 2.3 Harvesting and processing technologies
- 2.4 NTFP collection and processing technologies

UNIT 3 WILDLIFE-SPECIFIC TECHNOLOGIES (8)

- 3.1 Non-invasive camera trapping
- 3.2 Conservation/research Drones
- 3.3 Location tracking
- 3.4 Acoustic monitoring
- 3.5 Molecular technologies for wildlife management

UNIT 4 COMPUTER PROGRAMMING (10)

- 4.1 Basic computer programming concept
- 4.2 Introduction to computer programming language
- 4.3 Introduction and use of database management system (MS Access)
- 4.4 Introduction to C and C++

UNIT 5 ARTIFICIAL INTELLIGENCE TECHNOLOGIES (5)

- 5.1 Basic concept of machine learning and neural networks
- 5.2 Use of artificial intelligence for forest management
- 5.3 Use of artificial intelligence for big data analysis and decision making
- 5.4 AI for biodiversity conservation and wildlife management- Introduction of Visual Object Tagging Tool (VOTT)

PRACTICAL WORK/FIELD WORK/EXCURSION

1. Field visit to smart nursery
 - a. Green house and smart nursery
2. Wood processing
 - a. Field visit to wood processing industry and study forest specific technologies
3. Radio collars and tracking animals
 - a. Field visit and study wildlife-specific technologies for collaring, tracking tools
4. Setting up camera traps and
 - a. Setting camera traps, checking and data management
5. Use of Introduction of Visual Object Tagging Tool (VOTT)
6. Molecular lab visit
 - a. Lab - DNA extraction, PCR to study wildlife specific technologies

REFERENCES

1. Grant H, Dawn R. M and, Falk H. (eds) (2018). Machine Learning for Ecology and Sustainable Natural Resource Management. Springer.
2. Jasanoff, Sheila (2016). The Ethics of Invention: Technology and the Human Future. W.W.Norton.
3. Martin W., Benjamin L and , Stefan D (eds) 2016. Remote Sensing and GIS for Ecologists: Using Open Source Software (Data in the Wild) Illustrated Edition. Pelagic Publishing, UK
4. Parthiban, K. T. and R. Seenivasan (eds) (2017). Forestry Technologies - A Complete Value Chain Approach. Scientific Publisher, New Delhi, India.
5. Wich, Serge A., and Alex K. Piel (eds) (2021). Conservation Technology. Oxford Academic, 18 Nov. 2021), <https://doi.org/10.1093/oso/9780198850243.001.0001>, accessed 9 Nov. 2022





FMS 504: Forest Resource Assessment (IEE/EIA)

Course number	Course title	Credit hours
FMS 504	Forest Resource Assessment (IEE/EIA)	3 (2 + 1)

SCOPE

This course covers forest cover mapping (extents of forests and changes over time) and national forest inventory (quality of forest in terms of growing stock, biomass, and carbon). Students will learn an environmental assessment which includes process, methods and results, and also monitoring and auditing. The teaching style of this course will include a combination of classroom learning and field.

OBJECTIVES

- Develop an understanding of the need for forest and environmental assessment
- Describe the methods and process for forest and other land cover mapping
- Provide knowledge and skills of measurement and monitoring of forest and its components
- Improve theoretical and practical understanding of the environmental assessment and monitoring and auditing

EXPECTED OUTCOMES

Upon the completion of this course, student will be able to prepare forest and other land cover maps, conduct forest and carbon inventory and outline the processes associated with environmental studies. Moreover, they will be able to prepare environmental study reports and conduct environmental audit.

COURSE DESCRIPTION

UNIT 1. INTRODUCTION TO FOREST RESOURCE ASSESSMENT (2)

- 1.1 Overview of global and national Forest Resource Assessment (FRA)
- 1.2 Scope, aim and objectives of FRA

UNIT 2. LAND COVER MAPPING (6)

- 2.1 Land cover monitoring system – global, regional and national
- 2.2 Ecosystems, vegetation and forest type of Nepal
- 2.3 Forest and land cover monitoring system – approach, methods and process
- 2.4 Data sources – remotely sensed and ground-based observations
- 2.5 Extent of forest and other land cover, and change analysis
- 2.6 Map validation and accuracy assessment

UNIT 3. NATIONAL FOREST INVENTORY (8)

- 3.1 Principles of national forest monitoring
- 3.2 Field sampling design and plot design
- 3.3 Field data collection – plot level attributes and tree characteristics
- 3.4 Measurement of shrubs, seedlings and saplings, deadwood, litter and wood debris
- 3.5 Data management and data analysis – growing stock, biomass and carbon
- 3.6 Documentation, reporting and verifications
- 3.7 Errors and accuracy assessment for national forest inventory
- 3.8 Quality assurance and quality check (QA/QC)

UNIT 4. ASSESSMENT OF SOC, BIODIVERSITY AND DISTURBANCES (4)

- 4.1 Collection of soil samples and soil profiles

- 4.2 Laboratory methods for SOC
- 4.3 Biodiversity assessment and monitoring (herbs, climbers, faunal, NTFPs etc.)
- 4.4 Forest disturbances, invasive species, forest disease and pest etc.

UNIT 5. CONCEPT OF ENVIRONMENTAL ASSESSMENT (6)

- 5.1 Origin and development of environmental assessment
- 5.2 Policy and legal provisions on environmental assessment in Nepal
- 5.3 Types of environmental assessment (BES, IEE, EIA, SEIA, SEA) and their salient features
- 5.4 Process for environmental assessment (SD/ToR, public engagement, approval etc.)
- 5.5 Process and indicators of environmental monitoring
- 5.6 Process for environmental auditing

UNIT 6. ASSESMENT OF ENVIRONMENTAL IMPACTS AND MANAGEMENT PLANNING (6)

- 6.1 Identification and prediction of physical impacts
- 6.2 Identification and prediction of biological impacts
- 6.3 Identification and prediction of socio-cultural and economic impacts
- 6.4 Stakeholder analysis and alternative analysis
- 6.5 Enhancement of positive impacts and mitigation of negative impacts
- 6.6 Preparation of environmental management plan

PRACTICAL

Forest resource assessment:

- FRA sample plot measurement – (a) plot variables measurement, (b) tree plus seedling and sapling attributes, and (c) disturbance, biodiversity and soil characteristics (3 days field excursion)
- Preparation of forest and other land cover maps by integrating RS/GIS and field survey (3 hrs. Lab for map preparation and 1 day field excursion for round truthing)
- NFI data management and analysis – calculation of volume, biomass and carbon (Lab. 3 hrs.)

Environmental assessment:

- EIA field exercise – data collection on three components: physical, biological and socio-cultural and economics (one – two group each for each component - 1 day field excursion)
- Practical exercise on preparation of environmental management plan (Lab. – 6 hrs.)

REFERENCES

1. FAO. 2017. Voluntary Guidelines on National Forest Monitoring. FAO, Rome.
2. FAO. 2020. Global Forest Resources Assessment 2020: Main Report. Rome, Italy.
3. FRTC. 2022. Field Manual, 2022 (Re-measurement of Permanent Sample Plot for Forest Resource Assessment (FRA). Forest Research and Training Center (FRTC), Kathmandu, Nepal.
4. FRTC. 2022. National Land Cover Monitoring System of Nepal. Forest Research and Training Centre (FRTC). Kathmandu, Nepal.
5. GFOI. 2020. Integration of remote-sensing and ground-based observations for estimation of emissions and removals of greenhouse gases in forests. Methods and Guidance Document (MGD Edition – 3.0). Global Forest Observations Initiative (GFOI). Rome, Italy.
6. IPCC. 2006. IPCC Guidelines for National Greenhouse Gas Inventories. Volume 4: Agriculture, Forestry and Other Land Use.
7. IPCC. 2019. Volume 4: Agriculture, Forestry and Other Land Use. 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
8. RIC. 2018. Biodiversity monitoring protocol for REDD+. REDD Implementation Centre, Ministry of Forests and Environment, Government of Nepal. Kathmandu, Nepal.

9. Tucker, G., Bubb P., de Heer M., Miles L., Lawrence A., Bajracharya S.B., Nepal R. C, Sherchan R., Chapagain N.R. 200J. Guidelines for Biodiversity Assessment and Monitoring for Protected Areas. KMTNC, Kathmandu, Nepal.



FMS 505: Field Study: Forest Management in Nepal and India

Course number	Course title	Credit hours
FMS 505	Field Study VI: Forest Management in Nepal and India	3 (0 + 3)

SCOPE

This field study course is designed to expose students with the opportunity to observe and interact with the real field situation. The field study offers in-depth understanding of silviculture, forest management, wildlife conservation, forest-based industries being managed by the government, community and private entrepreneurs in Nepal and India. The class exercise is limited to critical observations, de-briefing, and field report.

OBJECTIVES

- Understand the forest bureaucracy, practices of silvicultural systems, scientific forest management, forest management models of India in reference to Nepal.
- In-depth understanding of Forest, NTFP, MAP, nursery, plantations, protection, harvesting and utilization practices of India and Nepal.
- Understand the operation, production and efficiency of forest-based industries (timber, NTFP and MAP) of India and Nepal.
- Familiarization of wildlife-protected area, zoological garden, botanical garden, and ecotourism management of India in reference to Nepal.
- Familiarization with advances in forestry research, education and training programs in India
- Develop skills in preparing forest stand management plans based on social and biophysical settings

EXPECTED OUTCOMES

Understanding the scientific forest management, forest protection, remote sensing, soil conservation, wildlife conservation, forest utilization, forest-based industries, MAPs cultivation and value addition. In addition, translate the learning by comparing the operation and efficiency between Nepal and India.

COURSE DESCRIPTION

Students shall interact with the state forest department, forest-based industries and MAP stakeholders on conservation and management practices. The field study course is designed to look closely into the following forest management practices in both India and Nepal.

- Visit the Divisional Forest Offices and Protected Areas of Kanchanpur and Kailali Districts, Nepal
- Visit the Divisional Forest Offices of Uttar Pradesh and Uttarakhand State Forest Departments – territorial forest management, wildlife conservation and soil conservation
- Visit, observe and understand the advances in research, education and training at the following institutes in Dehradun, Uttarakhand, India
 - Forest Research Institute and University (FRIU) – Departments of silviculture, genetics, soil science, social forestry, forest protection, timber mechanics, forest utilization, etc.
 - Indira Gandhi National Forest Academy (IGNFA)
 - Wildlife institute of India (WII)

- Indian Institute of Soil and Water Conservation (ICAR)
- Wadia Institute of Himalayan Geology
- Forest Survey of India (FSI), Dehradun – Forest and climate change monitoring
- Indian Institute of Remote Sensing (IIRS) – Space technology and forest monitoring
- Visit Forest Based Industries in Nepal and India – pulp and paper, match, plywood, composite wood, rosin and turpentine, oil extracts, MAPs processing, pharmaceutical, silk, dyes, lac, etc.
- Prepare forest stand management plans based on social and biophysical settings

Note: Field schedule should be arranged as per convenience.

REFERENCES

14. Dwivedi, A.P. 2002. A text book of Silviculture. International Book Distributors, India.
15. FRI, 1970. Indian Forest Utilization vol. I and II, FRI Dehradun, India.
16. Khanna, L.S. 1985. Principle and practice of silviculture. International book distributors, India.
17. Negi, S.S. 1997 Wood Science and Technology, International book distributors, India.
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