

SYLLABUS

Masters of Science in Community Forestry 2024



Tribhuvan University
Institute of Forestry
Kirtipur,
Kathmandu



FOREWORD

The Master of Science degree in Community Forestry, conferred by Tribhuvan University, stands as an advanced educational milestone designed to cultivate adept professionals in the field of community forestry. This academic journey has been shaped by a commitment to excellence, and the number of curriculum revisions ensures that the course is aligned with the changing context. The curriculum overhaul is an integral part of the Institute of Forestry's (IOF) comprehensive review process. This revision aims to fortify the student's proficiency in applying fundamental principles of community-based forest management to address contemporary challenges in professional practice.

At the heart of this revision process lies a collaborative spirit, with experts and stakeholders engaged at both national and international levels. Leveraging their insights, the curriculum has been crafted aiming that equip students to confront the evolving issues within the community forestry sector. The courses introduced are strategically designed to tackle the myriad challenges associated with the community forest, particularly in the face of escalating global changes. The envisioned outcome is to empower students with analytical skills, decision-making abilities, and the capacity to address the multifaceted nature of problems inherent in the field of community forestry while balancing the trade-off between ecological and societal needs.

Embarking on this new academic journey, the subjects are identified considering these multiple roles of community forestry, where the subject committees and faculty board of the IOF took a leadership role in shaping it. Moreover, many individuals and institutions have contributed directly and indirectly to bring this curriculum to this shape. This is also an outcome of the consultative processes carried out at different levels. I express my sincere thanks to internal and external experts, subject committee chairs and members, and the Faculty Board for their kind cooperation and contributions. Special appreciation is extended to the ALIGN project WWF Nepal for their financial support in the preparation of the syllabus. Further, I would like to extend my special thanks to the Academic Council of Tribhuvan University for approving this curriculum. I appreciate the contribution of curriculum revision committee members Associate Prof. Dr. Sony Baral, Prof. Dr. Krishna Raj Tiwari, Prof. Dr. Rajesh Kumar Rai, Associate Prof. Dr. Narayan Prasad Gautam and Associate Prof. Dr. Menuka Maharjan, IOF for revising the M.Sc. syllabus with leaving no stone unturned.

I am confident that our students will serve as warriors for addressing the planetary crisis, that we are now facing, such as global climate change, biodiversity losses, and environmental issues. Moreover, they will serve in the sustainable management of the global commons. As we step into this renewed academic chapter, we remain committed to upholding the highest standards of education and fostering a learning environment that prepares our students to be leaders and innovators in their respective fields.

Prof. Bir Bahadur Khanal Chhetri, PhD
Dean

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INTRODUCTION

Community forestry is currently grappling with a confluence of challenges, including climate change, biodiversity loss, and the need for sustainable production and development on a global scale and also the envision of community forestry have in 1990s is guiding up to now. This has led to an escalating level of pressure and threats on forests, which serve as pivotal entities in addressing numerous national and international challenges. The role of the academics is pivotal in addressing these global challenges. In response to the evolving demands of the market, the Master's program in Community Forestry has been revised to enhance the skills of students and preparing them to navigate the diverse aspects of technical, field, and policy dimensions within the sector. The program is designed not only to equip students with the knowledge necessary to address complex national and international forest challenges but also to empower them to seek, negotiate, and implement solutions in the face of a rapidly changing world.

The Institute of Forestry (IOF) aims to provide high quality education, developing critical thinking skills, and preparing students for their future careers in forestry and natural resources sectors. This is achieved through a multifaceted approach encompassing extensive field research, a dynamic forest lab, an on-campus museum, and impactful outreach programs. Established in 1947 AD, the IOF is the pioneer institute dedicated to imparting comprehensive knowledge and technical expertise in Forestry and allied sectors. As a hub for advanced education in forestry, the Institute of Forestry continues to play a pivotal role in developing skilled professionals and the sustainable management of Nepal's rich natural resources.

The IOF has been offering academic degrees, Bachelor's in forestry, Masters and PhD programs in various fields of Forest Science, including Forestry; Community Forestry; Wildlife Management and Biodiversity Conservation; Mountain Environment and Development Studies; Watershed Management; and Natural Resource Management and Rural Development. The IOF periodically revises the curriculum, engaging academicians, development practitioners, researchers, and policymakers to provide students with the current state of knowledge on forestry sciences and allied sectors and make them competent to address the emerging issues and challenges within it. The M.Sc. programs have been designed as per the increasing needs of the diverse areas and expanding context and career landscape at the national and international levels. Considering the forest is key to addressing many of these national and international challenges diverse Master programs have been introduced and revised as per the need.

The updated course streamlines the learning process by introducing a unified first-year curriculum, ensuring that students, regardless of their specialization (Forestry, Wildlife Management and Biodiversity Conservation, Natural Resources Management and Rural Development, Watershed Management, Mountain Environment and Development Studies, Community Forestry), develop a foundational understanding of crucial interdisciplinary concepts against the backdrop of pressing issues such as policy, forestry, climate change, biodiversity loss, and pollution. The primary objective of this program is to produce skilled human resources in the field of community forestry with a special focus on community-based forest management. The program will also fulfill the following specific objectives:

- Produce human resources to strengthen community-based forest management and resource governance for better conservation and management of the forest.
- Develop essential skills to manage community-based forestry projects.

For this program adopts a pragmatic, field-based teaching approach, emphasizing applied learning structures. Our graduates will be equipped with a versatile skill set that positions them to ascend in government service, attain notable success in academic pursuits, establish themselves as successful entrepreneurs, and secure high-profile green jobs. The comprehensive academic journey will prepare them to thrive in various career paths and to contribute significantly to their chosen fields.

PROGRAM DURATION AND ACADEMIC SESSION

The Community Forestry program will span two academic years, comprising a total of four semesters. The first semester focuses on the theoretical aspects of forest and natural resource management. The second semester emphasized on tools and techniques required for data collection and analysis. The third semester focuses on community-based forest management models, sustainable forest management and political ecology. The fourth semester is allocated for conducting research and sharing their findings.

COURSE CODE AND CODE NUMBERS

The course code provided in this curriculum comprises a concise representation of the Subject Matter Committee, including a number and additional information enclosed in parentheses. The initial abbreviated text within the course code signifies the specific Subject Committee category to which the course belongs. The abbreviations corresponding to the course codes are outlined below:

- PWM: Park Recreation and Wildlife Management
- SFB: Silviculture and Forest Biology
- SFM: Social Forestry and Forest Management
- WME: Watershed Management
- FPE: Forest Products and Engineering
- BSH: Basic Science and Humanities

ADMISSION, EVALUATION AND AWARD OF DEGREE

The candidates should possess a 4-year undergraduate degree in either B.Sc. Forestry, Engineering/ Agriculture and Science degree from Tribhuvan University or any institution acknowledged by Tribhuvan University. All students must appear in the entrance examination administered by the Examination Section of the IOF and are selected for admission based on their merit score. Both academic achievements and performance in the entrance examination will play a crucial role in the admission process.

Evaluation and Examination System

Each semester, students undergo a comprehensive evaluation, encompassing both internal and external assessments. To pass the examination, students are required to secure a minimum of 50% marks in the final external (final exam) and internal (practical and assessments) examinations separately. The grading system allocates 40% of the marks to internal and 60% to the external (final) exams.

The administration of internal examination marks falls under the responsibility of the respective course coordinator, ensuring transparency and accuracy in the assessment process. However, the evaluation culminates in the final written examination, scheduled at the end of the semester. It is imperative to note that students must fulfill the prerequisite of passing the internal to be eligible to sit for the final examinations. In case of students failing to meet the passing criteria in the regular semester examination, they are provided with an opportunity to appear in a make-up examination. Nevertheless, students must adhere to the protocol of filling out the examination form for the respective semester.

The internal marks are given by the responsible course teacher based upon the assessment of attendance tracking, and various tasks such as fieldwork, laboratory exercises, term papers, class presentations, report writing, project work, and home assignments. The assessment process is undertaken by the faculty responsible for each course, who provide clear and detailed evaluation criteria to students well in advance. This proactive communication ensures students to understand and meet the expectations set forth in their courses effectively. Further, the Dean's office will form a committee to evaluate the completion of internal assessment and the marks given by the responsible course teacher. The committee will be responsible for reviewing the internal assignments and carried out while teaching the course and the evaluation criteria for the internal evaluation set by the course responsible teacher as per the nature and objective of the course. The committee will also be authorized to change or not to change the marks given by the internal evaluator if deemed necessary. Finally, the committee will submit report together with the marks of all subject of the semester to the Dean's Office stating whether or not the courses were taught and the evaluation were done in a scientific manner.

The student's thesis will undergo evaluation by the Research Assessment Committee (RAC), coordinated by the main supervisor alongside internal and external experts. The internal expert will be selected by the respective campus, while the external expert will be chosen by the exam control division, ensuring alignment with the subject area's relevance.

Attendance Requirement

A student must attend at least 80% of classes in each subject. Attendance carries 20% marks on the internal assessment. Failure to fulfill the attendance requirement by a student may result in his/her disqualification to appear in the final examination. But, in specific cases (seriously ill, out of control situation) student having 70% attendance are allowed to appear the final examination. In this case, student should submit medical certificate for seriously ill, and certificate of the concerned authority in other cases.

Academic Transcript and Grading System

After the successful completion of all the requirements prescribed by the course curriculum, a student will be eligible for the award of an M.Sc. degree in the respective programs. An academic transcript is issued by the Controller of Examination of Tribhuvan University to students who have fulfilled all requirements. The academic standard of students is based on the cumulative percentage of marks secured in all examinations. The IOF adopted the grading system indicated in credit transfer, grading system, and the academic transcript study report of 2020 approved by TU Academic Council decision no 64 on 2078/1/14 [Table 1].

Table 1: Grading System for M.Sc. Program

Grade	GPA	Grading Scale (in %)	Performance
A	4.0	90-100	Outstanding
A-	3.7	80- less than 90	Excellent
B+	3.3	70-less than 80	Very good
B	3.0	60- less than 70	Good
B-	2.7	50 -less than 60	Satisfactory
F	0.0	Less than 50	Fail

In this system, a student has to receive a minimum of 2.7 GPA or letter "B-" grade to pass each course.

In every semester, students will be given Semester Grade Point Average (SGPA) using the following calculation

$$SGPA = \frac{\text{Total Grade Point earned in a semester}}{\text{Total Number of credit registered in a semester}}$$

Based on the grades earned in each semester, Cumulative Grade Point Average (CGPA) will be calculated as follows:

$$CGPA = \frac{\text{Total Grade Point earned}}{\text{Total Number of credits completed}}$$

SEMESTER-WISE COURSE BREAKDOWN

Semester I	Course	Credit	Page Number
SFM 501	Forest and Environment Policy	3	7
SFM 502	Nature and Society	3	11
WME 503	Water- Energy-Food- Ecosystem Nexus	3	15
PWM 504	Landscape Management and Biodiversity Conservation	3	20
SFM 505	Natural Resource Management in Changing Environment	3	24
Semester II			
WME 551	Geoinformatics for NRM	3	28
BSH 552	Research Design and Scientific Writing	3	32
BSH 553	Advanced Statistics	3	36
SFM 554	Natural Resource Economics	3	39
SFM 556	GESI in Forestry	3	42
Semester III			
SFM 607	Global CBFM Models	3	45
SFM 608	Forest Tenure and Governance	3	50
SFM 609	Political Ecology	3	53
SFM 610	Sustainable Forest Management	3	57
SFM 612	Project Management (Optional)	3	61
SFM 606	Natural Resource Professional Ethics (Optional)	3	66
Semester IV			
SFM 651	Proposal	2	70
SFM 652	Pre-defense	2	70
SFM 699	Dissertation	9	70
SFM 653	Manuscript of Research Work	2	70

COURSE DESCRIPTIONS

SEMESTER I

COURSE TITLE: FORESTS AND ENVIRONMENTAL POLICY

Course Code	Credit	Lecture Hours (Theory +Practical)	Total Marks (External/final +Internal)
SFM 501	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: Forest and other environmental policies play an important role in sustainable resource management. This course is designed to introduce students to the contextual understanding of policies that have shaped the management of renewable resources (i.e., forest, wildlife, water, etc.) in Nepal and beyond. Throughout the course, students will learn ideas behind natural resource policies and try to understand their role in broader natural resource decision-making.

OBJECTIVES: The objectives of this course are to:

- To facilitate student learning in forest and environmental policymaking and be able to apply this understanding to case studies of environmental and natural resource policy issues.
- To familiarize students with the development of key national and international policies for natural resources and environmental sustainability.
- To familiarize students with the organizational and administrative structure and policy-making processes of the major federal natural resource management agencies in Nepal.
- To facilitate students in their ability to critique and evaluate policy processes and policy outcomes in the context of emerging market issues and changing natural resource conditions.

LEARNING OUTCOMES: Upon the completion of this course, the students will be able to

- Have a clear understanding of the evolution and administrative functionalities of major forest and environmental policies in Nepal.
- Understand the public policy formulation process in national and international contexts.
- Understand the evolution of environmentalism in national and international contexts.
- Be familiar with the various policies and regulations in Nepal pertaining to environment and natural resources.

COURSE CONTENTS

UNIT 1: INTRODUCTION TO FOREST AND ENVIRONMENTAL POLICY (6)

- 1.1 Natural Resource Management and Politics
- 1.2 Importance of Public Policy
- 1.3 Evolution of Environmental Policy (forest, watershed, wildlife)
- 1.4 Global Challenges in Natural Resource Management / Planetary Crisis
- 1.5 Tragedy of the Commons

1.6 Externalities and Market Failure

UNIT 2: POLICY PROCESS MODELS (8)

- 2.1 Economic, Political, and Ethical Perspectives on Environmental Policy
- 2.2 Natural Resource Policy as a Process
- 2.3 Public (forest/watershed/wildlife) Policy Formulation Process in Nepal
- 2.4 Environmental Sustainability and Natural Resource Policies
- 2.5 Criteria for Policy Analysis

UNIT 3: ENVIRONMENTALISM AND ENVIRONMENTAL POLICIES (8)

- 3.1 Environmentalism and its Impact on Policies
- 3.2 Theoretical Foundation: Ecocentrism, Anthropocentrism, and Deep Ecology
- 3.3 Emergence of Environmental Impact Assessment as a Policy Tool
- 3.4 Endangered Species Conservation and International Trade

UNIT 4: INTERNATIONAL CONSERVATION POLICIES (4)

- 4.1 International Convention Joining and Withdrawal Process
- 4.2 Earth Summit 1992 and its Outcome Conventions
- 4.3 International Climate Agreements and their Effectiveness

UNIT 5: SECTORAL POLICIES IN NEPAL (6)

- 5.1 Constitutional Provisions Related to Natural Resources
- 5.2 Sectoral Policies (Other) and Natural Resource Conservation
- 5.3 Synergies in Natural Resource Related Policies (Climate, Environmental, Forests, Watershed, Wildlife)
- 5.4 Natural Resource Revenue Sharing Mechanism

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
History of policies (Sectoral) in Nepal	Literature	Literature Review and Presentation	Unit 1 & 4
Policy analysis of Nepal Forest/Environment/Watershed/ climate policy (Outcomes)	Policy document	Group work / Report	Unit 2
Improving EIA in Nepal	Expert Consultation	Group work / Critiques and Suggestions	Unit 3
Status and Challenges of International Treaties in Nepal	Literature, Expert Consultation	Group work/ Report	Unit 5
Policies in Nepal	Literature	Review / Class Discussion	Unit 6

KEY REFERENCES

Unit 1

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6. Verran, H. (2009). Natural Resource Management's 'Nature' and Its Politics. *Communication, Politics & Culture*, 42(1), 3-18.

Unit 2

1. Bromley, D. W., & Paavola, J. (2002). Economics, ethics and environmental policy. *Economics, ethics, and environmental policy: contested choices*, 261-276.
2. Cabbage, F. W., Laughlin, J. O' & Peterson, M. N. (2017). *Natural Resource Policy*. Waveland Press, Inc. 10-digit ISBN: 1-4786-2965-X; 13-digit ISBN: 978-1-4786-2955-9.
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Unit 3

1. Balistrieri, Carlo A. (1993). CITES: The ESA and international trade. *Natural Resources & Environment* 8, no. 1: 33-76.
2. Bullard, R. D., & Johnson, G. S. (2000). Environmentalism and public policy: Environmental justice: Grassroots activism and its impact on public policy decision making. *Journal of social issues*, 56(3), 555-578.
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Unit 4

1. Almer, C., & Winkler, R. (2017). Analyzing the effectiveness of international environmental policies: The case of the Kyoto Protocol. *Journal of Environmental Economics and Management*, 82, 125-151.
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7. United Nations (1992). United Nations Framework Convention on Climate Change.
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Unit 5

1. Constitution of Nepal (2015).
2. Nepal Kanun Kitab Byabastha Samiti (Acts – Land, Infrastructure, Mine, Industry, Hydropower).
3. National Natural Resource and Fiscal Commission Act.
4. National Natural Resource and Fiscal Commission. (2017). Recommendation on the Distribution of Royalties from Natural Resources Mobilization.

COURSE TITLE: NATURE AND SOCIETY

Course Code	Credit	Lecture Hours (Theory +Practical)	Total Marks (External/final +Internal)
SFM 502	3	48 (32+16)	75 (45+30)

Note: 1 Credit= 16 Lecture Hours

SCOPE: This course covers key theoretical concepts and approaches in social sciences as they relate to understanding and describing the relationship between society and nature. It is intended to help students develop contemporary knowledge and practical skills in assessing and analyzing the causes and solutions of natural resource problems by integrating concepts and foundational theories in social science disciplines.

OBJECTIVES: The objectives of this course are to:

- Foster an understanding of the evolution of human-nature relationships
- Develop a deeper understanding of the complex dynamics of coupled human and natural systems
- Enhance knowledge regarding various social science theories in explaining and predicting human behavior in the context of natural resource management
- Develop a critical foundation for further research on human-nature interactions with using the concepts and skills of conservation social science

LEARNING OUTCOMES: Upon the completion of this course, the students are expected to be able to:

- Know a range of foundational theories in social science to explain and predict the interaction between humans and nature
- Understand the evolving complexity of human and natural systems, including disturbance and adaptation
- Identify and evaluate the importance of cultural and economic institutions in the sustainability of natural resources
- Become familiar with diverse ways human values, beliefs, and norms relate to their behavior toward nature and,
- Integrate ideas and practices from contemporary social science in planning, decision-making, and policy regarding sustainable management of natural resources.

COURSE CONTENTS

UNIT 1: FOUNDATIONS OF NATURE AND SOCIETY (5)

- 1.1 Human History and Nature
- 1.2 Equilibrium and Non-Equilibrium Ecology
- 1.3 Philosophical Foundation of Nature-Human Relationship (Eco-centric, Anthropocentric)
- 1.4 The Social Construction of Nature
- 1.5 Nature and Culture

UNIT 2: CHANGES, CHALLENGES, AND PARADIGM SHIFT IN CONSERVATION

(6)

- 2.1 Anthropocene Biosphere
- 2.2 Planetary Boundaries
- 2.3 Limits to Growth
- 2.4 Ecological Modernization
- 2.5 Bright Green Environmentalism
- 2.6 Eco-centric vs Anthropocentric

UNIT 3: HUMAN NATURE INTERACTION (8)

- 3.1 Social-Ecological Systems
- 3.2 Common Property Regimes
- 3.3 The Community Capital Framework
- 3.4 Collective Actions and Impact
- 3.5 Intermediate Disturbance Hypothesis

UNIT 4: SOCIAL CONTEXT OF NATURE-BASED SERVICES (5)

- 4.1 The Worth of Nature to Humans
- 4.2 Ecosystem Marketplace as a Solution
- 4.3 Climate Change and Social Cost of Carbon
- 4.4 Opportunity Cost Approach in Conservation Priorities
- 4.5 Environmental Consumerism

UNIT 5: CULTURE AND WORLDVIEWS (8)

- 5.1 Drivers of Human Behaviors
 - 5.1.1 Theory of Behavior
 - 5.1.2 Value-Belief Norm Theory
- 5.2 Demographic Influences on Conservation Values
- 5.3 Nature-Culture/Indigenous People Relationship
- 5.4 Social Trust in Natural Resource Management

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
Indigenous community (ethnic group) and nature relationship (Ethnicity/culture-wise group)	Literature review/ reading materials	Group discussion	Unit 1
Influence of human-nature Interaction on Nepal's Forest/environment/wildlife /Watershed Policy Development	Literature review	Group presentation	Unit 2
Social-ecological system	Field	A report on SES / Group	Unit 3

KEY REFERENCES

TEXT BOOK

1. Misiune, I., Depellegrin, D., & Egarter Vigl., L. (2022). *Human-Nature Interactions: Exploring Nature's Values Across Landscapes* (p. 438). Springer Nature.

Unit 1

1. Kai N. Lee., W. R. Freudenburg., and R. B. Howarth. (2013). *Humans in the Landscape: An Introduction to Environmental Studies*. Pages 258-86.
2. Meadows, D. H., Meadows, D. L., & Randers, J. (1993). Beyond the limits: An executive summary. *Bulletin of science, technology & society*, 13(1), 3-14.
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Unit 2

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Unit 4

1. Stern's review
2. Dasgupta Review
3. Westman, W. E. (1977). How Much Are Nature's Services Worth? *Science* 197: 960-964

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Unit 5

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COURSE TITLE: WATER-ENERGY-FOOD-ECOSYSTEM NEXUS

Course Code	Credit	Lecture Hours (Theory +Practical)	Total Marks (External/final +Internal)
WME 503	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: Water, energy, land/food, and ecosystems (WEFE) are critical for nutrition and food security, healthy ecosystems, resilient economies, and sustainable development. Single disciplinary (or silo) approach has limitations to achieve the interconnected development goals (e.g., sustainable development goals) in inclusive manner whereas the nexus approach considers the interconnections among the sectors, quantifies synergies and trade-offs of an intervention, and also has the potential to serve as a climate change adaptation and human security solutions. However, governments, stakeholders, and investors are struggling to manage systems change in the WEFE nexus and ensure that the changes are robust under changing climate and evolving interactions among natural and human systems. In this context, this course starts with the context of natural resources under stress, introduces associated concepts, and then evolves into the system approach, nexus concept and principles, entry points for inclusion, system interactions, nexus assessment tools, nexus in practice and nexus future perspective. It includes theoretical sessions, assignments, practical/presentation sessions, and field studies. The course is divided into 5 chapters and 20 sub-chapters, with four sub-chapters in each chapter.

OBJECTIVES: This course aims for the following learning objectives

- To familiarize with the fundamentals of WEFE nexus in the context of natural resources management and climate change
- To enhance knowledge and skill in nexus assessment
- To provide exposure to practical cases and challenges for implementing WEFE nexus using context-specific and participatory approaches
- To deepen understanding of institutionalizing WEFE nexus
- To provide a future outlook of WEFE nexus as a sustainability agenda from people-centric lenses and Gender Equality, Disability and Social Inclusion (GEDSI) perspectives

LEARNING OUTCOMES: Upon the completion of this course, learners are expected to

- Internalize the nexus concept and apply as a solution in planning and designing natural resources development and management problems
- Develop interdisciplinary programs in a professional career with a focus on broader national goals rather than sector-specific goals
- Develop skills to engage with stakeholders to develop sustainable and participatory practices for WEFE nexus management
- Develop number of demonstrated cases of nexus solutions during professional practice and share in public domain

COURSE CONTENTS

UNIT 1: UNDERSTANDING OF NEXUS (6)

- 1.1 Stress in Natural Resources: Trends in Natural Resources Availability and Demand; Concept of Footprints (water, energy, and carbon footprints); Planetary Boundaries
- 1.2 System Approach: Understanding of a System and System Approach; Need of Integration Across Sectors; Evolution of the Nexus Thinking Approach (limits to growth, sustainability, and nexus)
- 1.3 WEF Nexus: Concept, Principles, and Added Benefits
- 1.4 Entry Points for Inclusion in Nexus Interventions

UNIT 2: SYSTEM INTERACTION (6)

- 2.1 Water-Energy
- 2.2 Water-Food
- 2.3 Food-Energy
- 2.4 Interdependences and Inter-Linkages Across Multiple Systems (e.g., water, energy, food, ecosystem/biodiversity): Tradeoff and Synergies

UNIT 3: ASSESSMENT TOOLS (9)

- 3.1 Assessment Process and Information Flow: Steps, Actors, Location, and Sectors
- 3.2 Various Types of Tools and Data
- 3.3 FAO Rapid Appraisal Tools and WEF Nexus Tool 2.0 (including demonstration of tool)
- 3.4 Scenario Analysis and Practical Challenges: Evaluating Impacts in the Changed Context (institutional changes, climate/environmental/socio-economic changes, policy changes, etc.)

UNIT 4: NEXUS IN PRACTICE (6)

- 4.1 Dissecting Nexused Relationships on Existing Practices: Case Studies Highlighting Different Aspects of Nexus in Practice
- 4.2 Risks and Costs to Different Social Groups
- 4.3 Policy and Institutional Reforms
- 4.4 GEDSI and Indigenous Knowledge

UNIT 5: NEXUS FUTURE PERSPECTIVE (5)

- 5.1 Nexus Governance: Fundamentals of Governance and Nexus Governance; Frameworks for Governance Analysis; Improving Sectoral Governance and for Nexus Gains
- 5.2 Streamlining WEF Nexus as a Common Agenda: Promoting Dialogue (between science, policy, practice/industry, private sector); Nexus Mainstreaming
- 5.3 Addressing Bottlenecks for Implementing Inclusive Solutions for WEF Nexus Gains: Technical/Engineering Solutions; Nature-Based Solutions; Governance Solutions
- 5.4 Monitoring, Evaluation, Accountability and Learning (MEAL) Framework for Maximizing Nexus Gains

PRACTICAL (16)

- **Group assignment:** Divide the participants into different groups, each consisting of 3-5 persons. Ask the participants to identify one practical case that they are engaged with,

characterize the WEF nexus in that case, and then submit an assignment report as well as a presentation in class. There will be more discussions and inputs in the class from the instructor as well as other participants (beyond that particular group) to visualize the practical cases of the WEF nexus. (4 hrs)

- **Assignment on application of FAO tool and WEF nexus 2.0:** Based on data provided for a real or hypothetical case study for simulating WEF nexus 2.0, and demonstration made in Chapter 3, students will prepare and submit a report on analysis of trade-offs and synergies and recommend potential solutions for minimizing tradeoffs and maximizing the synergies. (4 hrs)
- **Field study:** Students will join to 1-2 days field study in nearby areas to select 1-2 cases of different orientations (e.g., water, energy, food, ecosystem) but have nexused relationships and dissect nexused relationships in those cases, prepare a report and present in the class as post-field study report. (8 hrs)

Contents	Equipment/ tools	Methodology/methods	Link to Unit(s)
Dip dive nexused relationship in existing approaches	Reference materials, Analytical thinking	Literature review to understand nexused relationship Selected a couple of cases of different orientation Think critically to visualize interlinkages (trade-offs and synergies) Identify challenges and opportunities	Unit 1, 2, 4
Visualize nexus governance and explore the potential of WEF nexus as a future security agenda	Field logistics, Reference materials, Analytical thinking	Field visits, Interaction with related stakeholders, Critical thinking to visualize interlinkages (trade-offs and synergies), and governance Identify the challenges faced and ways they are managed	Unit 5
Perspectives, cross-fertilization, and synthesis	Field data, Critical thinking	Analyses of field visit/data, Perspectives from different cases explored (e.g., management, policy, governance), Synthesis	Unit 1,2,3,4,5

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COURSE TITLE: LANDSCAPE MANAGEMENT AND BIODIVERSITY CONSERVATION

Course Code	Credit	Lecture Hours (Theory +Practical)	Total Marks (External/final +Internal)
PWM 504	3	48 (32+16)	75 (45+30)

Note: 1 Credit= 16 Lecture Hours

SCOPE: This course is designed to develop an understanding of issues on conservation landscape (hereafter referred to as landscape), landscape ecology, and biodiversity conservation. To prepare for careers in landscape and biodiversity conservation, students must attain academic skills and knowledge (both theoretical and technical) related to landscape management and biodiversity conservation. This course will help enrich student's understanding of biodiversity conservation at the landscape level. It enhances students' capacity to identify the prospects and challenges of biodiversity conservation and management in multiple-use landscapes.

OBJECTIVES

- Familiarize students with key technical terms related to landscape ecology, and biodiversity conservation.
- Enrich students' knowledge on landscape principles, and best conservation practices at landscape levels.
- Increase students' understanding on the causes and consequences of biodiversity loss in human-dominated landscapes.
- Enrich student's knowledge and skill in landscape planning, management, and biodiversity conservation.

LEARNING OUTCOMES: At the end of the course, students will be able

- To understand the basic landscape and biodiversity-related key terminologies
- To explore and understand landscape-level conservation values and challenges
- To learn the theories and principles related to landscape ecology
- In planning and implementation of landscape-level conservation initiatives
- To gain knowledge on biodiversity conservation and management in a human-dominated landscape

COURSE CONTENTS

UNIT 1: INTRODUCTION (6)

1.1 Landscape

1.1.1 Concept of Landscape and Landscape Ecology

1.1.2 Review of the Key Terms: Habitat, Eco-region, Biomes, Biodiversity Hotspots, Biodiversity Cold Spots, Habitat Fragmentation, Edge Effect, Corridors and Connectivity, Upstream-downstream Linkages, Landscape Integrity and Functions

- 1.1.3 Epistemology of the Landscape
 - 1.1.3.1 The Nature of Landscape (material and conceptual)
 - 1.1.3.2 Role of Landscape (domain, system, Unit)
 - 1.1.3.3 Description of Landscape (ecological and cognitive)
- 1.1.4 Landscape Functions and Dynamics: Linkages with Species and Human Culture (IT/TK)
- 1.2 Biodiversity
 - 1.2.1 Components of Biodiversity (genetic diversity, species diversity, ecosystem diversity, functional diversity)
 - 1.2.2 Species Richness Over Geological Time Scale (rates of species formation, rates of species extinction, current pattern of species richness)
 - 1.2.3 Values and Importance of Biodiversity (consumptive and non-consumptive use values, productive use values)
 - 1.2.4 Patterns of Diversity (variation along climate and environment, variation in topography, geological age, and habitat)
 - 1.2.5 Concept of Climate Change Refugia

UNIT 2: THEORIES AND MODELS IN LANDSCAPE ECOLOGY (6)

- 2.1 Driving Forces for Landscape Approach (international dialogue, conservation debate, innovations)
- 2.2 Landscape Stability Principle and CBD Malawi Principle 1995
- 2.3 Theories Incorporated in Landscape Ecology: Complexity Theory, Information Theory, Cognition and Autopoiesis Theory, Hierarchy Theory, Percolation Theory, Resource Theory
- 2.4 Landscape Ecology Models
 - 2.4.1 Metapopulation Model
 - 2.4.2 Source-Sink Model
 - 2.4.3 Island Biogeography Equilibrium

UNIT 3: PRINCIPLES FOR LANDSCAPE CONSERVATION, MANAGEMENT AND DESIGN (10)

- 3.1 Landscape Evaluation (creating and quantifying landscape patterns)
- 3.2 The Cultural (human-dominated) Landscape (interaction between natural and cultural landscapes, fragility of the cultural landscapes, cultural keystone species, landscape indicators, predictive landscape models)
- 3.3 Principles for Landscape Management
- 3.4 Landscape Ecology (landscape principles for natural reserves, disturbance regime, and reserve design indications, inter-refuge corridor design)
- 3.5 Principles of Landscape Classification (structural patch, functional patch, resource patch, habitat patch, corridor patch)
- 3.6 Landscape Level Conservation
- 3.7 Ecosystem Processes on Landscapes
- 3.8 Hierarchical Structure of the System and Biodiversity Conservation
- 3.9 The Landscape-level Species Conservation Approach
- 3.10 Transborder Landscape Conservation Approaches

UNIT 4: BIODIVERSITY CONSERVATION IN HUMAN-DOMINATED LANDSCAPE

(4)

- 4.1 Biodiversity Conservation (with examples: in-situ and ex-situ)
- 4.2 Issues of Biodiversity Conservation
- 4.3 Urban Biodiversity Conservation Challenges
- 4.4 Green Infrastructure: Linking Landscape and Community
- 4.5 Roles of Ecosystem Management in Landscape Integrity: Protected Area: Core and Buffer Zone, Habitats Outside PAs, MAB (Man and Biosphere Reserve), Other Effective Area-Based Conservation Measure (OECM)
- 4.6 Importance of Landscape-level Biodiversity for Promoting Ecosystem Services and Local Livelihood in Developing Countries

UNIT 5: LANDSCAPE MANAGEMENT FOR BIODIVERSITY CONSERVATION (6)

- 5.1 Evolution and Practices of Landscape Management Models (global to national)
- 5.2 Conservation Landscapes of Nepal (TAL, CHAL, Kanchenjunga, SHL, and Kailash)
- 5.3 Prospects and Challenges of Landscape Management and Biodiversity Conservation
- 5.4 Land Use Planning and Conservation
- 5.5 Landscape Effects: In Individuals, Populations, and Organisms
- 5.6 Landscape Management Approaches and Strategies
 - 5.6.1 River Basin Approach
 - 5.6.2 North-South and East-West Landscape Approach
- 5.7 Case Studies
 - 5.7.1 Nepalese Model: Landscape (e.g., TAL, CHAL) and Corridor (e.g., Khata Corridor, Barandabhar Corridor)
 - 5.7.2 North American Model: (e.g., Yukon to Yellow stone)
 - 5.7.3 South African Model: (e.g., Great Limpopo Transfrontier Park)

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit (s)
Measuring biodiversity	Silva compass, measuring tape, crown-densitometer, Abney level	Three days Field Diversity index (Simpson, Shannon Wiener)	Unit 1
Designing biodiversity conservation activities in the urban landscape	Reports, related literature	Observation, FGD, meetings with nearby community, KIS,	Unit 1, 3
Study linkages with species and human culture	Checklist	Literature review, Report writing	Unit 1
Review of CBD Malawi Principle 1995	Related literature	Group presentation, report	Unit 2
Study on urban biodiversity challenges and threats ranking	Related literature	Excursion, Observation, Review of literature, Assessment by pairwise ranking, Report writing	Unit 4

KEY REFERENCES

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Unit 5

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COURSE TITLE: NATURAL RESOURCE MANAGEMENT IN CHANGING ENVIRONMENT

Course Code	Credit	Lecture Hours (Theory +Practical)	Total Marks (External/final +Internal)
SFM 505	3	48 (32+16)	75 (45+30)

Note: 1 Credit= 16 Lecture Hours

SCOPE: Changing the environment has jeopardized human-nature interaction, which has created a lose-lose scenario. This course focuses on understanding the changing context, its impacts on natural resources, and their mitigation, adaptation, and management strategies.

OBJECTIVES: The objectives of the course are to:

- To understand the changing context
- To understand key environmental issues and their effects on nature and society
- To assess appropriate strategies for natural resource management in the changing contexts
- To understand the issues in changing contexts in NRM in Nepal

LEARNING OUTCOMES: On completion of this course, students should be able to:

- Understand the changing contexts and its effects on natural resources
- Analyze the natural resource management related issues in the changing contexts,
- Develop a conceptual and practical understanding of strategies for natural resource use and management in the changing environmental conditions
- Apply the learned concepts to a natural resource management problem of particular interest to them

COURSE CONTENTS

UNIT 1: UNDERSTANDING THE CHANGING CONTEXT (5)

- 1.1 Theoretical context – Change Theory
- 1.2 Global Environmental Changes: Climate Change, Land Use and Land Cover Change, Invasive Species
- 1.3 Social Changes- Demographic Shifts, Cultural Transformations, Technological Advancement, Urbanization, Gender Roles and Equality, Environmental Movement
- 1.4 Economic Changes – Technological Transformations, Globalization, Labor Market Change, Financial System, Environmental and Sustainable Practices, Income equality, Global Economic Shift

UNIT 2: EFFECTS OF CHANGING ENVIRONMENT ON NATURAL RESOURCES (7)

- 2.1 Effects on:
 - 2.1.1 Water Resources– Glacier’s Retreat, Precipitation Pattern, Sea Level, Spring, Rivers, Groundwater, Wetlands
 - 2.1.2 Agricultural Resources– Agro-Biodiversity, Cropping Pattern, Pest and Diseases
 - 2.1.3 Forest and Biodiversity– Shift in Habitat Ranges, Increased Wildfire, Invasive Alien Species
 - 2.1.4 Wildlife

- 2.1.5 Rangelands
- 2.1.6 Landscape
- 2.2 Alteration of Human-Nature Interactions Due to Changing Context

UNIT 3: MITIGATION AND ADAPTATION STRATEGIES (5)

- 3.1 Sustainable Land and Water Management
- 3.2 Biodiversity Conservation and Restoration
- 3.3 Climate Resilient Infrastructure
- 3.4 Traditional Knowledge, Practices, and Technologies
- 3.5 Renewable Energy Transition

UNIT 4: ISSUES IN NRM IN CHANGING CONTEXT IN NEPAL (5)

- 4.1 Shift in Demand for Natural Resources
- 4.2 Land Abandonment
- 4.3 Human-Wildlife Conflict
- 4.4 Governance Conflict (conflict among governments)
- 4.5 Level of Participation in Natural Resource Management

UNIT 5: MANAGING NATURAL RESOURCES IN CHANGING ENVIRONMENT (10)

- 5.1 Ecological Principles and their Application to Natural Resource Management
- 5.2 Adaptive Management
- 5.3 Forest-Landscape Restoration
- 5.4 Invasive Species Management
- 5.5 Nature Based Solutions
- 5.6 Disturbance-Based Ecosystem Management

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
Drivers of changing context	Field /Checklist	Prepare a list of drivers and strategies to address them (Group work)	Unit 1, 2
Issues of NRM in Nepal and potential solutions	Literature review	Group / Class presentation	Unit 4
Enlisting mitigation/adaptation/management interventions in own locality	Interview (Telephone), Field observation	Individual - list of interventions	Unit 3, 4, 5

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Unit 2

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Unit 3

1. Dale, V. H., Brown, S., Haeuber, R. A., Hobbs, N. T., Huntly, N., Naiman, R. J., ... & Valone, T. J. (2014). Ecological Principles and Guidelines for Managing the use of the Land: Ecological Applications (2000). *The ecological design and planning reader*, 279-298.
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Unit 4

1. Laudari, H. K., Sapkota, L. M., Maraseni, T., Subedi, P., Pariyar, S., Kaini, T. R. & Volkova, L. (2024). Community forestry in a changing context: A perspective from Nepal's mid-hill. *Land Use Policy*, 138, 107018.
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Unit 5

1. Bolte, A., Ammer, C., Löf, M., Nabuurs, G. J., Schall, P., & Spathelf, P. (2009). Adaptive forest management: a prerequisite for sustainable forestry in the face of climate change. *Sustainable forest management in a changing world: a European perspective*, 115-139.
2. von Gadow, K. (2008). *Managing forest ecosystems: the challenge of climate change* (p. 338). F. Bravo, V. LeMay, & R. Jandl (Eds.). New York: Springer.
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5. Kuuluvainen, T., Angelstam, P., Frelich, L., Jögiste, K., Koivula, M., Kubota, Y., ... & Macdonald, E. (2021). Natural disturbance-based forest management: Moving beyond retention and continuous-cover forestry. *Frontiers in Forests and Global Change*, 4, 629020.
6. Seddon, N., Chausson, A., Berry, P., Girardin, C. A., Smith, A., & Turner, B. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Philosophical Transactions of the Royal Society B*, 375(1794), 20190120

SEMESTER II

COURSE TITLE: GEOINFORMATICS FOR NRM

Course Code	Credit	Lecture Hours (Theory +Practical)	Total Marks (External/final +Internal)
WME 551	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: This course is designed for the students having background on the foundation of GIS and Remote Sensing (RS). As the name says “Geoinformatics”, the course contents aim to provide broader understanding on the application of GIS and Remote Sensing in NRM, with particular focus on developing skills on geospatial data extraction, analysis, modelling, management and effective communication for sharing the research widely. The course is based on both the theoretical and lab-based teaching/learning approaches.

OBJECTIVES: The course aims to provide advanced knowledge on applying geospatial technologies and remote sensing in natural resources management with the particular focus on emerging technologies for data analysis and cloud computing. The specific objectives of this course are to make students:

- Understand recent advancements/trends in Geoinformatics including theoretical and practical knowledge on the advanced concepts of RS & GIS in NRM.
- Enhance knowledge and practical skills on geo computation including exploratory data analysis and advanced concepts on spatial statistics.
- Develop a theoretical foundation on geomodelling and practical hands-on modelling related to NRM used cases.
- Provide overview and hands-on on emerging geospatial technologies for NRM like Machine Learning (ML) cloud computing with Google Earth Engine (GEE).

LEARNING OUTCOMES: After the completion of the course, the learners are expected to be able to:

- Develop a project and use advanced GIS/RS techniques for data collection to address specific problems in NRM
- Use geo-computational and statistical knowledge for data cleaning, analysis and management
- Use geospatial techniques for predictive modelling - NRM used cases.
- Use Cloud computing platform for efficient data analysis and visualization

COURSE CONTENTS

UNIT 1: OVERVIEW OF GEOINFORMATICS (6)

- 1.1 Fundamentals of Remote Sensing and GIS
- 1.2 Data to Geoinformation in NRM (data sources and availability, acquisition, interpretation and data quality issues)
- 1.3 RS and GIS Software (open source and commercial)
- 1.4 Recent Advancements/Trends in Geoinformatics
 - 1.4.1 Mobile GIS, Drone-Based GIS, Citizen Science in GIS
 - 1.4.2 Overview of Google Earth Engine, AI, and ML in NRM

UNIT 2: REMOTE SENSING SATELLITE AND SENSORS (8)

- 2.1 Sensors and Satellites (including orbits)
- 2.2 Scanning Systems
- 2.3 Optical Remote Sensing
- 2.4 Hyperspectral Remote Sensing
- 2.5 Radio Detection and Ranging (RADAR) Remote Sensing
- 2.6 Light Detection and Ranging (LIDAR) Remote Sensing

UNIT 3: GEOCOMPUTATION (6)

- 3.1 Digital Image Processing and Classification
- 3.2 Review Geospatial Interpolation (Kriging, / IDW, etc.)
- 3.3 Geospatial Statistics
- 3.4 Map Algebra and Raster Models Analysis
- 3.5 Terrain and Visibility Analysis

UNIT 4. GEOMODELLING (6)

- 4.1 Database Queries and Geo-Processing
- 4.2 Model Building for Geo-Processing
- 4.3 AHP Modelling
- 4.4 Geo-Visualization (cartographic representation)

UNIT 5. APPLICATION OF GEOSPATIAL TECHNOLOGIES (6)

- 5.1 Resource Assessment and Management.
- 5.2 Risk Assessment (forest fire, landslide)
- 5.3 Suitability Analysis
- 5.4 Analyzing Multi-Temporal Earth Observation Data

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit (s)
Image acquisition and processing	QGIS, /ArcGIS	Practical: 4hrs Demo and case presentation Student Engagement: 10hrs	Unit 1
Data cleaning and/map algebra and raster models/ surface and visibility analysis	QGIS/ ArcGIS	Practical: 4hrs One demo and other can be case presentation Student Engagement: 6hrs	Unit 3
Data queries/ Analysis and geo-visualization.	QGIS/ArcGIS	Practical: 3hrs one demo and other case presentation Student Engagement: 12hrs	Unit 4
Forest resource inventory and mapping/ indices (e.g., NDVI, NDSI, NDWI calculation)/Suitability/Time-series analysis	Cloud computing/GEE/ QGIS/ ArcGIS	Practical: 5hrs one demo and other case presentation Student Engagement: 20hrs	Unit 5
Project report and presentation		Review and report	

KEY REFERENCES

Unit 1

1. Duckham, M., Goodchild, M. F., & Worboys, M. (2003). Foundations of geographic information science. CRC Press.
2. Liu, J. G., & Mason, P. J. (2016). Image processing and GIS for remote sensing: techniques and applications. John Wiley & Sons.
3. McInerney, D., & Kempeneers, P. (2014). Open source geospatial tools: applications in earth observations. Earth Systems Data and Models, Springer.
4. Ma, X., Mookerjee, M., Hsu, L., & Hills, D. (Eds.). (2023). *Recent Advancement in Geoinformatics and Data Science* (Vol. 558). Geological Society of America.
5. Chuvieco, E. (2020). *Fundamentals of satellite remote sensing: An environmental approach*. CRC press.
6. Bajracharya, B., Thapa, R. B., & Matin, M. A. (2021), Earth observation science and applications for risk reduction and enhanced resilience in Hindu Kush Himalayan Region, Springer Nature, free access

Unit 2

1. Verbyla, D. L. (2022). *Satellite remote sensing of natural resources*. CRC Press.
2. Varshney, P. K., & Arora, M. K. (2004). *Advanced image processing techniques for remotely sensed hyperspectral data*. Springer Science & Business Media.
3. Richards, J. A. (2009). *Remote sensing with imaging radar* (Vol. 1, pp. 172-173). Berlin/Heidelberg, Germany: Springer.

4. Liang, S., & Wang, J. (Eds.). (2019). *Advanced remote sensing: terrestrial information extraction and applications*. Academic Press.
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7. Flores-Anderson, A. I., Herndon, K. E., Thapa, R. B., & Cherrington, E. (2019). The SAR handbook: comprehensive methodologies for forest monitoring and biomass estimation (No. MSFC-E-DAA-TN67454).

Unit 3

1. Chun, Y., & Griffith, D. A. (2013). *Spatial statistics and geostatistics: theory and applications for geographic information science and technology*.
2. Getis, A., Anselin, L., Lea, A., Ferguson, M., & Miller, H. (2004). Spatial analysis and modeling in a GIS environment. In *A research agenda for geographic information science* (pp. 157-196). CRC Press. (Unit 4 too).

Unit 4 and 5

1. McClain, B. P. (2022). *Python for Geospatial Data Analysis*. " O'Reilly Media, Inc."
2. Crooks, A., Malleon, N., Manley, E., & Heppenstall, A. (2015). Agent-based modeling and geographical information systems. *Geocomputation: A Practical Primer*. SAGE Publications Ltd, Thousand Oaks, CA, 63-77.
3. Pourghasemi, H. R., & Gokceoglu, C. (2019). *Spatial modeling in GIS and R for earth and environmental sciences*. Elsevier.
4. Wani, A. A., Bali, B. S., Ahmad, S., Nazir, U., & Meraj, G. (2022). Geospatial Modeling in Landslide Hazard Assessment: A Case Study along Bandipora-Srinagar Highway, NW Himalaya, J&K, India. In *Geospatial Modeling for Environmental Management* (pp. 113-125). CRC Press.
5. Wang, L., Yin, D. Z., & Caers, J. (2023). *Data science for the geosciences*. Cambridge University Press. (Unit 5 too).
6. Moseley, B., & Krischer, L. (2020). *Machine learning and artificial intelligence in geosciences*. Academic Press. (Unit 5 too).

COURSE TITLE: RESEARCH DESIGN AND SCIENTIFIC WRITING

Course Code	Credit	Lecture Hours (Theory +Practical)	Total Marks (External/final +Internal)
BSH 552	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: The scope of this course is designed to imbue M.Sc. students with a scientific perspective, bridging the gap between overarching methodological principles and the intricacies of systematic inquiry into literature. It equips students with the skills needed to adeptly select and employ a range of research methods and tools for data collection. Through this course, students are equipped with the proficiency to thoughtfully select and deploy a diverse array of research methods and tools, ensuring a holistic approach to data collection. Moreover, the course offers a guided journey through the entire research process. From the initial stages of data collection to the in-depth analysis, students receive hands-on guidance that facilitates a comprehensive comprehension of each step. Furthermore, the course guides them through the entire process, from analysis to effectively articulating and presenting their research findings in their M.Sc. thesis.

OBJECTIVES: The objectives of this course are to:

- Acquire a profound understanding of diverse research types, encompassing their distinctive characteristics and ethical considerations.
- Comprehend both quantitative and qualitative research designs, mastering the art of employing various data collection methods to ensure the generation of high-quality data.
- Cultivate the ability to conduct thorough literature reviews, organizing information systematically to build a solid foundation for research endeavors.
- Hone skills in crafting meticulous and comprehensive research proposals, coupled with the proficiency to eloquently defend them during presentations, showcasing a mastery of the subject matter.
- Develop the capacity to articulate research findings effectively through the composition of clear and concise research reports, thesis documents, and scientific articles.

LEARNING OUTCOMES: Upon course completion, students will adeptly handle the intricacies of research methodology, understanding the critical connection between research questions and theoretical frameworks.

- Gain the capability to independently formulate and develop robust research proposals aligned with overarching research objectives.
- Acquire practical skills in data generation and analysis, utilizing diverse research methods and analytical tools to produce high-quality data and insightful interpretations.
- Navigate the complexities of an M.Sc. thesis, demonstrating proficiency in structuring and integrating research findings within theoretical frameworks.
- Demonstrate adeptness in manuscript composition and effectively communicating research findings with clarity and impact.

COURSE CONTENTS

UNIT 1: RESEARCH CONCEPTS (6)

- 1.1 Definition and Purpose
- 1.2 Research Paradigm (Normative, Explorative, Critical)
- 1.3 Research Types (Qualitative, Quantitative and Mixed)
- 1.4 Conceptual Framework of Research
- 1.5 Research Ethics: Informed Consent, Data Use & Confidentiality, Research Interpretation, Authorship and Publication, Plagiarism)

UNIT 2: RESEARCH DESIGN (10)

- 2.1 Meaning, Concept, Importance
- 2.2 Research Design: Components and Features
- 2.3 Characteristics
- 2.4 Types of Designs
 - 2.4.1 Descriptive
 - 2.4.2 Diagnostic
 - 2.4.3 Experimental and Quasi-experimental
 - 2.4.4 Exploratory Formulative
 - 2.4.5 Case Study
- 2.5 Quantitative Research Design
 - 2.5.1 Definition
 - 2.5.2 Purpose
 - 2.5.3 Analytical Framework
 - 2.5.4 Data Collection Methods (sampling design and methods, survey)
 - 2.5.5 Data Reliability and Validity
 - 2.5.6 Data Analysis Methods (descriptive, inferential and casual analysis)
- 2.6 Qualitative Research Design
 - 2.6.1 Definition
 - 2.6.2 Purpose
 - 2.6.3 Analytical Framework (use of theories)
 - 2.6.4 Data Reliability and Validity
 - 2.6.5 Data Collection Methods (observation, focus group discussion, semi-structured interview, content analysis)

UNIT 3: LITERATURE REVIEW AND ORGANIZATION (4)

- 3.1 Purpose and Types of Review
- 3.2 Review Organization
- 3.3 Citation and Reference Management

UNIT 4: RESEARCH PROPOSAL WRITING (4)

- 4.1 Research Proposal (purpose, components, and format)
- 4.2 Research Subject and Object
- 4.3 Formulating of Research Problem
- 4.4 Defining Research Objectives
- 4.5 Setting Research Hypothesis/Questions (meaning, definitions, nature, functions, importance, kinds, characteristics, formulation and testing)
- 4.6 Research Matrix

- 4.7 Research Site Selection
- 4.8 Respondent Selection
- 4.9 Data Collection Methods
- 4.10 Data Analysis
- 4.11 Work Plan
- 4.12 Budget Estimation

UNIT 5: THESIS WRITING AND PRESENTATION (4)

- 5.1 Purpose and Characteristics of the Good Thesis
- 5.2 Outline of the Thesis /Major Chapters or Sections
- 5.3 Data Analysis and Interpretation
- 5.4 Discussion on Findings (convergence and divergence analysis)
- 5.5 Establishing a Causal Link Between Objective, Findings, Conclusion and Recommendations
- 5.6 Thesis Presentation: Slide Preparation, Table Graph, etc.

UNIT 6: SCIENTIFIC PAPER WRITING (4)

- 6.1 Step-wise Procedure
- 6.2 Selecting a Journal for Publication/Predatory
- 6.3 Communicating with the Journal Editor/Editorial Board
- 6.4 Peer Review Processes and Responding to Reviewer

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit (s)
Research Design	Classwork	Group discussion and panel discussion	Unit 1 & 2
Scientific paper writing	4-5 person in a team review and write paper	Review paper/research paper on the contemporary subjects related to their field of study (able to identify knowledge gap, analyses and interpreted study findings).	Unit 3, 6
Research proposal	Literature review	Each student will write, submit and present a research proposal in their area of interest.	Unit 4
Presentation	4-5 person in a team) will prepare and present their research findings	Prepare and present among students on their research findings and solicit comments and suggestions from students and faculties	Unit 3, 5, 6

KEY REFERENCES

Unit 1

1. Kumar, R. (2018). Research methodology: A step-by-step guide for beginners. *Research methodology*, 1-528.
2. Kerlinger, F. N. (1966). Foundations of behavioral research.
3. Mligo, E. S. (2016). *Introduction to research methods and report writing: A practical guide for students and researchers in social sciences and the humanities*. Wipf and Stock Publishers.

Unit 2

1. Bryman, A. (2012). *Social Research Methods*. Oxford University Press, New Delhi.
2. Cohen, L., Lawrence, M., & Morrison, K. (2005). *Research Methods in Education*, 5th edition. Oxford University Press, Oxford.
3. Denscombes, M. (2010). *The Good Research Guide, For Small-Scale Social Research Projects*. Open University Press, Maidenhead, Berkshire, UK.
4. Gregory, J., Miller, S., & Miller S. (2000). *Science in Public: Communication, Culture and Credibility*, Reprint edition. Perseus Book Group, New York.

Unit 3

1. Field, A. (2003). *How to Design and Report Experiments*. Sage Publications, Newbury Park, California.
2. Glass, D. (2006). *Experimental Design for Biologists*. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
3. Holliman, R., Whitelegg, L., Scanlon, E., Smidt, S., & Thomas, J. (2009). *Investigating science communication in the information age: Implications for public engagement and popular media*. Oxford University Press.
4. Singh, Y.K. (2006). *Fundamental of Research Methodology and Statistics*. New International (P) Limited, Publishers, New Delhi.

Unit 4

1. Soraya, M.C. & Cynthia, A.S. (2001). *Proposal Writing*. Sage Publications, Newbury Park, California.
2. Wallinman, N. (2006). *Your Research Project: A Step-by-Step Guide for the First Time Researcher*. Sage Publications, London.

Unit 5

1. Adu, P & Miles D. A. (2024). *Dissertation Research Methods: A Step-by-Step Guide to Writing Up Your Research in the Social Sciences*. Routledge, New York.

Unit 6

1. Thomas, C.G. (2021). *Research Methodology and Scientific Writing* (2nd eds). Springer. <https://link.springer.com/book/10.1007/978-3-030-64865-7>
2. Hoffmann, A.H. (2009). *Scientific Writing and Communication: Papers, Proposals, and Presentations*. Oxford, UK.
3. Mligo, E.S. (2016). *Introduction to Research Methods and Report Writing. A Practical Guide for Students and Researchers in Social Sciences and the Humanities*. Resource Publications, Eugene, Oregon.
4. Day, R. A., & Gastel, B. (2024). *How to write and publish a scientific paper*. Cambridge University Press.

COURSE TITLE: ADVANCED STATISTICS

Course Code	Credit	Lecture Hours (Theory + Practical)	Total Marks (External/final + Internal)
BSH 553	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: The course will increase understanding on general concepts, meaning & use of statistics, and develop basic skills for computing & interpreting social and bio-physical data, and their applications using computer software in applied research. More importantly, the course aims to help M.Sc. students in selecting and use of different regression models in forestry research.

OBJECTIVES: The objectives of this course are to:

- Demonstrate the concepts of descriptive statistical measures, probability distribution and their uses in forestry research.
- Demonstrate basic concepts of hypothesis testing and experimental designs.
- Learn different types of parametric and non-parametric tests and use them in forestry research.
- Understand correlation and regression analysis and apply different types of regression models in forestry research and interpretation of results.
- Understand the concept of factor and discriminant analysis and develop skills for computation.

LEARNING OUTCOMES: Upon the completion of this course students will be able to

- Demonstrate the ability to understand the different types of variables and data
- Understand the appropriate use of statistical analysis
- Develop basic skills for computing & interpreting the data and their applications using computer software in applied forestry research.

COURSE CONTENTS

UNIT 1: INTRODUCTION (4)

Review: Data and its types, Variables and Scale of Measurement, Population and Sample, Central Tendency and Dispersion, Sampling Techniques

UNIT 2: PROBABILITY DISTRIBUTIONS (4)

Review of Binomial, Poisson and Normal Probability Distribution, and their applications

UNIT 3: ESTIMATION AND TESTING OF HYPOTHESIS (4)

Point Estimation, Interval Estimation; Parametric Tests: t-test, z-test, Non-Parametric Tests: Chi-square Test, Median test, Mann Whitney u-test, Kruskal Wallis test, Friedman ANOVA, Wilcoxon Sign Rank Tests

UNIT 4: ANALYSIS OF VARIANCE AND EXPERIMENTAL DESIGNS (6)

One-way and two-way ANOVA, Simple and Factorial Designs

UNIT 5: CORRELATION AND REGRESSION ANALYSIS (10)

Correlation Analysis, Ordinary Least Square Regression Models, Regression with Dummy Variables, Probit, Logit, Ordered Logit and Probit, MNL

UNIT 6: MULTIVARIATE ANALYSIS (4)

Principal Component Analysis (PCA), Factor Analysis, Cluster and Discriminant Function Analysis

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
Data entry, coding, and editing in statistical software	Computer	Use of the questionnaire/ data	Unit 1
Computation of frequency distribution, diagram, and graphs, descriptive measures and their interpretations	With appropriate software	Using student's own or the given data	Unit 1
Testing of different types of hypotheses: T-tests. F-test etc.	With appropriate software	Using student's own or the given data	Unit 2, 3
Use of different non-parametric tests and their interpretations	With appropriate software	Using student's own or the given data	Unit 3, 4
Linear regression models and testing assumptions: Normality, Multicollinearity	With appropriate software	Using student's own or the given data	Unit 5
heteroscedasticity and auto-correlation; analysis of residuals	With appropriate software	Using student's own or the given data	Unit 5
Fitting of the logit, Probit, ordered logit, multinomial logit regression models and their interpretations	With appropriate software	Using student's own or the given data	Unit 5
Principal component analysis	With appropriate software	Using student's own or the given data	Unit 6

KEY REFERENCES

Unit 1

1. Shrestha, S. & Silwal D.P. (2003). *Statistical Methods in Management*. Taleju Prakashan, Bhotahity Kathmandu.

Unit 2

1. Gupta, S. C., & Kapoor, V.K. (1994). *Fundamentals of Mathematical Statistics*, 4th edition. Sultan Chand & Sons; 23, Daryagunj, Delhi.

Unit 3

1. Levine, D. M., & Stephan, D. F. (2009). *Even you can learn statistics: A guide for everyone who has ever been afraid of statistics*. FT Press.
2. Shrestha, S. & Silwal, D.P. (2003). *Statistical Methods in Management*. Taleju Prakashan, Bhotahity Kathmandu.
3. Triola, M. F., Goodman, W. M., Law, R., & Labute, G. (2004). *Elementary statistics* (p. 794). Boston: Pearson/Addison-Wesley.

Unit 4

1. FAO (1999). *A Statistical Manual for Forestry Research*. Forestry research support program, for Asia and the Pacific, Food and Agricultural Organization of the United Nations Regional Office for Asia and the Pacific, Bangkok.
2. Nargundkar, R. (2008). *Marketing Research: Text and Cases- Third edition*. Tata McGraw-Hill Publishing Company Limited, NEW DELHI

Unit 5

1. FAO (1999). *A Statistical Manual for Forestry Research*. Forestry research support program, for Asia and the Pacific, Food and Agricultural Organization of the United Nations Regional Office for Asia and the Pacific, Bangkok.
2. Levine, D. M., & Stephan, D. F. (2009). *Even you can learn statistics: A guide for everyone who has ever been afraid of statistics*. FT Press
3. Snedecor, G.W., & Cochran, W.G. (1994). *Statistical Methods*, eighth edition. Iowa State University Press, Ames Iowa.

Unit 6

1. FAO (1999). *A Statistical Manual For Forestry Research*. Forestry research support program, for Asia and the Pacific, Food and Agricultural Organization of the United Nations Regional Office for Asia and the Pacific, Bangkok.
2. Levine, D. M., & Stephan, D. F. (2009). *Even you can learn statistics: A guide for everyone who has ever been afraid of statistics*. FT Press
3. Nargundkar, R. (2008). *Marketing Research: Text and Cases- Third edition*. Tata McGraw-Hill Publishing Company Limited, NEW DELHI

COURSE TITLE: NATURAL RESOURCE ECONOMICS

Course Code	Credit	Lecture Hours (Theory + Practical)	Total Marks (External/final + Internal)
SFM 554	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: This course focuses on the concept of both theoretical and empirical evaluation of natural resources (forests, biodiversity, and water) pertaining to management. It includes subjects related to the time value of money, evaluation of a natural resource management project from an economic perspective, application of different valuation techniques to estimate the non-market benefits obtained from an ecosystem, practice of ecosystem service market, and green economy promotion for strong sustainability. Basically, it aims to capacitate students to analyze the problems and practices prevailing in the natural resource management sector from an economic perspective.

OBJECTIVES: The general objective of this course is to train students to promote economically viable natural resource management. Specific objectives are to:

- Enable students to understand and practice economic evaluation of natural resource management projects
- Enable students to estimate non-market benefits received from ecosystems
- Understand the importance of the ecosystem service market
- Prepare strategies for green economy promotion towards sustainable development

LEARNING OUTCOMES: After the completion of this course, students will be able to

- Understand and analyze the existing problems associated to natural resource management from the economic perspective
- Apply different economic evaluation tools in natural resource management
- Estimate non market benefits of ecosystem services and provide policy feedback for its proper management
- Practice activities for green financing promotion and support for green accounting of natural resource

COURSE CONTENTS

UNIT 1: INCORPORATING ENVIRONMENT INTO THE ECONOMIC SYSTEM (4)

- 1.1 Ecological Economics vs Environmental Economics
- 1.2 Economy-Environment Systems
- 1.3 Modelling Economy-Environment Interactions

UNIT 2: VALUATION OF ECOSYSTEM SERVICES (12)

- 2.1 Concept of Valuing the Ecosystem Services
- 2.2 Valuation Techniques
 - 2.2.1 Direct Market Approach
 - 2.2.1.1 Market Price Method
 - 2.2.1.2 Production Function Approach
 - 2.2.1.3 Cost-based Approach

2.2.2 Non-Market Based Valuation Techniques

2.2.2.1 Contingent Valuation

2.2.2.2 Travel Cost Method

2.2.2.3 Hedonic Price Method

UNIT 3: BENEFIT-COST ANALYSIS (8)

- 3.1 The Foundations of Benefit-Cost Analysis
- 3.2 Steps of Benefit-Cost Analysis
- 3.3 Time Value of Money (Discounting and Compounding, One-time payment, Annual Payment and Perpetual, Periodic Payment and Perpetuity)
- 3.4 Decision Criteria (Net Present Value, Benefit-Cost Ratio, Internal Rate of Return)
- 3.5 Sensitivity Analysis

UNIT 4: ECOSYSTEM SERVICES MARKET (4)

- 4.1 Financing Green and Greening Financing
- 4.2 Payment for Ecosystem Services
- 4.3 Forest Carbon Offset and Market
- 4.4 Biodiversity Offsets

UNIT 5: ENVIRONMENT AND SUSTAINABLE DEVELOPMENT (4)

- 5.1 Concept of Weak and Strong Sustainability
- 5.2 Sustainable accounting (Green accounting): System of National Accounting (SNA) and System of Environmental Economics Accounting (SEEA)

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
Natural Resources	Questionnaire, Excel, Data	Contingent Valuation Method	Unit 1, 2
Recreation areas such as protected areas/wetlands	Questionnaire, Excel, Data	Travel Cost Method	Unit 1,2
Evaluation of an environmental project/ Opportunity cost of carbon	Excel, Data	Benefit-cost analysis	Unit 3
Financing solutions	Peer-reviewed papers	Group presentation	Unit 4
SEEA of protected area/ CF	Peer-reviewed papers	Class Room discussion	Unit 5
Nature as an Input	Data, Excel	Production Function Approach	Unit 2

KEY REFERENCES

Unit 1

1. Adger, W. N. (2014). Environmental and ecological economics. In *Environmental science for environmental management* (pp. 93-118). Routledge.
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Unit 2

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Unit 4

1. Brears, R. C. (2022). Financing Nature-Based Solutions. In *Financing Nature-Based Solutions: Exploring Public, Private, and Blended Finance Models and Case Studies* (pp. 29-50). Cham: Springer International Publishing.
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Unit 5

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2. Pelenc, J., Ballet, J., & Dedeurwaerdere, T. (2015). Weak sustainability versus strong sustainability. Brief for GSDR United Nations, 1-4.
3. Barua, A., & Khataniar, B. (2016). Strong or weak sustainability: A case study of emerging Asia. *Asia-Pacific Development Journal*, 22(1), 1-31.
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5. United Nations (2021). System of Environmental-Economic Accounting— Ecosystem Accounting (SEEA EA). White cover publication, pre-edited text subject to official editing. Available at: <https://seea.un.org/ecosystem-accounting>.

COURSE TITLE: GESI IN FORESTRY

Course Code	Credit	Lecture Hours (Theory + Practical)	Total Marks (External/final + Internal)
SFM 556	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: This course covers two broad domains viz. gender equality and social inclusion and its interconnection and importance with forestry. With the completion of this course, the students will have conceptual clarity on the present status of gender, its issues and challenges and ways to mainstream gender and social inclusion. With this, students will have a clear knowledge and understanding about gender integration in forestry research, programs, projects, and organizations as well as undertaking Gender Equality Disability and Social Inclusion (GEDSI) monitoring and evaluation in forestry programs.

OBJECTIVES: The objectives of this course are to:

- To understand the concept of gender equality, disability and social inclusion and their importance in natural resource management
- To investigate the challenges and ways to address those challenges in the Natural Resource Management (NRM) sector
- To understand concepts and policies of GEDSI regarding forestry and natural resource management
- To enable students to undertake GEDSI monitoring and evaluation in forestry contexts

LEARNING OUTCOMES: Upon the completion of this course, the students will be able to:

- To understand GEDSI policies and frameworks in forestry and other NRM sectors
- To evaluate GEDSI policies and framework in forestry and other NRM sectors
- To design and deliver training and workshops to stakeholders and user groups
- To engage with stakeholders and community groups on GEDSI issues concerning to forest and other natural resource management
- To undertake GEDSI monitoring and evaluation in the forestry context

COURSE CONTENTS

UNIT 1. UNDERSTANDING GENDER (4)

- 1.1 Sex and Social Construction of Gender
- 1.2 Deconstructing Sex and Gender
- 1.3 Gender Roles and Relations
- 1.4 Understanding Masculinity, Femininity, and Patriarchy
- 1.5 Intersectionality, Participatory Exclusion, Structural Exclusion
- 1.6 Concept of the emergence of Women in Development (WID), Women and Development (WAD), and Gender and Development (GAD) approaches
- 1.7 Evolution of GESI Concepts in Nepal

UNIT 2. GENDER EQUALITY, DISABILITY AND SOCIAL INCLUSION (GEDSI) (4)

- 2.1 Understanding Different Dimensions of GEDSI
 - 2.1.1 Gender Equality
 - 2.1.2 Disability
 - 2.1.3 Social Inclusion
- 2.2 Theory of Gender
 - 2.2.1 Feminist Theory
 - 2.2.2 Gender Differences Theory
 - 2.2.3 Identity Theory

UNIT 3. GEDSI INTEGRATION IN FORESTRY (4)

- 3.1 Access to and Control Over Resources
- 3.2 Gender Roles and Responsibilities in Natural Resource Management
- 3.3 Property Ownership and Resource Access Structure and its Relation to Benefit Sharing
- 3.4 Identifying Gender Dimension in Forestry Research

UNIT 4. METHODS AND TOOLS IN ANALYZING GEDSI IN NRM (8)

- 4.1 Gender Analysis Frameworks
 - 4.1.1 Social Relation Approach Framework
 - 4.1.2 Gender Analysis Matrix Framework
 - 4.1.3 Harvard Analytical Framework
 - 4.1.4 Moser Approach
 - 4.1.5 Feminist Political Ecology (FPA)
 - 4.1.6 Gender Integration Methods and Tools in Forestry Research and Project / Program Implementation
- 4.2 Gender Responsive Budget

UNIT 5. GENDER MAINSTREAMING, IMPORTANCE AND CHALLENGES (8)

- 5.1 Gendered Knowledge and Practices
- 5.2 Mainstreaming Gender in Multidiscipline
 - 5.2.1 Gender in Forestry and Other Natural Resources
 - 5.2.2 Tenure Form and Land Rights
 - 5.2.3 Livelihoods and Equality of Access to Forest Benefits and Sustainable Forest Management
 - 5.2.4 Agroforestry and Waters Resource
- 5.3 Gender Reality, Challenges and Prospects
 - 5.3.1 Women's Exclusion from Forestry
 - 5.3.2 Women Empowerment (Framework)
 - 5.3.3 Challenges in Gender Mainstreaming
 - 5.3.4 Gender and Climate Change

UNIT 6. NATIONAL POLICIES AND STRATEGIES RELATED TO GEDSI (4)

- 6.1 Gender Integration in National Policies and Strategies
- 6.2 Forestry and Gender Equality in the National and Global Areas
- 6.3 Gender Integration into National Forest Policies and Other Natural Resource Management Policies (e.g., Agriculture, Agroforestry, Water, National Park and Wildlife etc.)

- 6.4 Gender Responsive Budgeting in National and Sectoral Policies including Forestry
- 6.5 The Sexual Harassment at Workplace (Prevention) Act, 2014 (2071)
- 6.6 Various Stakeholders Working in GEDSI

PRACTICAL (16)

The students will be taken on short excursions to the nearby community forest or community-based forest enterprise where students will be able to analyze the rules, regulations, and practice of the CF/enterprise.

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
Gender analysis approaches	Class exercise	Discussion/class exercise	Unit 4
Develop the case of community forestry in mainstreaming gender in benefit distribution and benefit sharing	Content analysis of CFUG OP, guidelines, published research articles, text books etc.	KIS, FGD, consultation, OP review followed by presentation	Unit 5
GEDSI policies and strategies with reference to Nepal	GESI policies and strategies	Review	Unit 6

KEY REFERENCES

Unit 1

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2. West, C., & Zimmerman, D. H. (1987). Doing gender. *Gender & Society*, 1(2), 125–151.
3. Agarwal, B. (2001). Participatory exclusions, community forestry, and gender: An analysis for South Asia and a conceptual framework. *World Development*, 29(10), 1623-1648.

Unit 2

1. Srivastava, S. (2018). Masculinity studies and feminism: Othering the self, engaging theory. In *Men and feminism in India* pp. 35-49. Routledge India. Sage Publications, Social Construction of Sexuality.
2. Michalos, A.C. (Eds.). (2014). Feminist Theory. *Encyclopedia of Quality of Life and Well-Being Research*. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-0753-5_101387
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Unit 3

1. Asian Development Bank. (2012). Sectoral Perspectives on Gender and Social Inclusion Ministry of Forest and Soil Conservation (2064 B.S) Forest Sector Gender and Social Inclusion Strategy.

2. Rocheleau, D., & Edmunds, D. (1997). Women, men and trees: Gender, power and property in forest and agrarian landscapes. *World development*, 25(8), 1351-1371.
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1. West C., & Zimmerman, D.H. (1987). Doing gender, gender & society 1(2), 125-151.
2. GeMSIP. (2009). Gender Mainstreaming and Social Inclusion: Basic Training Manual. GeMSIP, GON, Kathmandu.
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Unit 5

1. Paudel, N.S., Ojha, H., Banjade, M.R., Karki, R. & Tamang, S. (Eds.). (2021). Revitalising community forestry in the changing socioeconomic context of Nepal. Kathmandu: EnLiFT2 programme and ForestAction Nepal. Research Paper Series on Improved Forest Management in Nepal, 2022-01: 1-86.
2. Wagle, R., Pillay, S., & Wright, W. (2017a). Examining Nepalese Forestry Governance from Gender Perspectives. *International Journal of Public Administration*, 40(3), 205–225.
3. Bhattarai, B. (2020). How do Gender Relations Shape a Community's Ability to Adapt to Climate Change? Insights from Nepal's community forestry. *Climate and Development*, 12(10), 876– 887.
4. ICIMOD. (2021). The State of Gender Equality and Climate Change in Nepal.
5. Giri, K., & Darnhofer, I. (2010). Outmigrating men: A window of opportunity for women's participation in community forestry? *Scandinavian Journal of Forest Research*, 25(sup9), 55-61.
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Unit 6

1. MoFSC. (2007). Gender and Social Inclusion Mainstreaming Strategy. Ministry of Forests and Soil Conservation, Government of Nepal, Kathmandu, Nepal.
2. ICIMOD. (2021). Summery for Policy Makers: The State of Gender Equality and Climate Change in Nepal.
3. GoN, PLGSP. (2021). Gender Equality and Social Inclusion (GESI) Strategy 2021-2023. Government of Nepal Ministry of Federal Affairs and General Administration Provincial and Local Governance Support Programme (PLGSP).

SEMESTER III
COURSE TITLE: GLOBAL COMMUNITY-BASED FOREST MANAGEMENT
MODELS

Course Code	Credit	Lecture Hours (Theory + Practical)	Total Marks (External/final + Internal)
SFM 607	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: Community-based forestry is recognized globally as a viable strategy for conserving forest ecosystems and supporting local livelihoods. This course is designed to provide students with the background of CBFM theory and international perspectives on community-based forestry. It exposes students to different practices of community-based forest management that are being practiced in Nepal and globally and examines the interactions between local people and forests. It uses real-world examples to impart knowledge and skills through lecture seminars, excursions, group exercises, tours and fieldwork.

OBJECTIVES: Upon the completion of this course, students will have:

- Recognized theory of commons and common property resources focusing to community-based forest management
- Integrated multidisciplinary knowledge to think critically about community-based forest management,
- Articulated the relevance and complexity of socio-political context on community-based forest management,
- Applied different tools and techniques to assess the effectiveness of community-based forestry,
- Articulated the relevance of forests in the context of the global arena.

LEARNING OUTCOMES: The course is designed to immerse students in a comprehensive exploration of the intricacies associated with managing forests within the context of community dynamics. Upon the completion of the course, students will be able to

- Gain in-depth knowledge of community-based forest management and apply the knowledge to practice.
- Delve into the ecological intricacies of forest ecosystems, social structures inherent in communities, and the economic factors influencing different forest management modalities and its sustainability.
- Equipped with the skills to navigate the complexities of community-based forest management, enabling them to implement sustainable strategies that harmonize environmental conservation with the socio-economic needs of local communities.

COURSE CONTENTS

UNIT 1. COMMON POOL RESOURCES AND PROPERTY RIGHTS (6)

- 1.1 Concept of Commons
- 1.2 Rules, Rights, and Property Regimes
- 1.3 *De facto* and *de jure* Property Rights
- 1.4 Cooperation Game

- 1.5 Common Property Institutions
- 1.6 Property Rights, Management, and Sustainable Outcomes
- 1.7 Types of the Property Rights and CBFM

UNIT 2. HUMAN AND NATURAL SYSTEM INTERACTIONS (4)

- 2.1 Theory of Himalayan Degradation
- 2.2 Perception of Scarcity
- 2.3 Driving Forces of Environmental Decline and its Sustainability
- 2.4 Ownership and Concept of Community
- 2.5 Local Knowledge and Customary Practices
- 2.6 Tenurial Rights of Local and Indigenous Communities

UNIT 3. THE ROLE OF COMMON POOL RESOURCES IN RURAL LIVELIHOOD SYSTEMS (4)

- 3.1 Understanding the Link between Forests and Livelihoods
- 3.2 Concept of Sustainable Livelihoods
- 3.3 Elements of Sustainable Livelihood Framework
- 3.4 Sustainability and Capital Assets
- 3.5 Capital Assets, Quality of Life, and Human Capability.
- 3.6 Capitals, Capabilities, and Spheres

UNIT 4. DESIGN PRINCIPLES OF COMMUNITY-POOL RESOURCE MANAGEMENT (4)

- 4.1 Theory of Collective Action and Social Cohesion
- 4.2 Ostrom's' Eight Design Principles of Common Pool Resource Management.
- 4.3 Applicability of the Design Principles in Community-based Forest Management
- 4.4 Critiques of the Design Principle
- 4.5 Adoption of Design Principles on Community-based Forestry Management in Nepal

UNIT 5. COMMUNITY-BASED FORESTRY MODELS (6)

- 5.1 Evolution of Community-based Forestry
- 5.2 Trends in Community-based Forestry
- 5.3 Community-Based Forestry Models: Participatory Conservation, Joint-Forest Management Community Forestry, Private Forestry
- 5.4 Devolution and Property Rights in different Community-based Forestry
- 5.5 Effectiveness of Community-based Forestry (changes in capitals; equity and poverty alleviation)
- 5.6 Requirements for Effective Community-based Forestry
- 5.7 Community-based Forest Models and Property Rights in Nepal

UNIT 6. CONTEMPORARY ISSUES AND GLOBAL POLICY INITIATIVES FOR COMMUNITY-BASED FORESTRY (8)

- 6.1 Overview of Global Forests and Extent of Community-based Forests
- 6.2 Community-based Forestry into an International Framework
- 6.3 Reducing Emissions from Deforestation and Forest Degradation
- 6.4 Recognition of Tenure Rights of Local and Indigenous Communities
- 6.5 Commercialization of Community-based Forestry Goods and Services
- 6.6 Contemporary Issues on Community-based Forestry

6.7 Governmentality and Bureaucratic Hegemony

6.8 Neo-liberalism and Environmental Discourse

PRACTICAL (16): Students in groups will carry out excursions, and fieldwork and prepare the report. Learning objectives

- Ability to recognize and describe interdisciplinary problems and issues of rural livelihoods in Nepal.
- Ability to select appropriate data collection methods, collect and analyze data from the field drawing from relevant theories.
- Ability to reflect critically on own conclusions and their relevance to society.

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
Local knowledge and customary practices	Field observation, semi-structure interviewed, and participant observation.	Divide students into groups and nominate group leader for each group. Finalize field work plan. Identify study area and individuals before visiting to field	Unit 2
Community forestry and household livelihood	Field observation, checklist	Divide students into groups with group leader for each group. Finalize field work plan, study area and household before visiting the field.	Unit 3
Community based forestry practices in Nepal	Discussion and review	Divide students in different groups and discuss the community forestry practices in Nepal focusing on design principles	Unit 4
Assessing effectiveness to community-based forestry	Field observation, group discussion, transect walk, key informant interviews, semi-structured interviews	Divide students into groups and nominate group leader for each group. Finalize field work plan, study area and key informants before visiting to field	Unit 5
Property rights on community-based forestry practices in Nepal	Discussion and review	Divide students in different groups and discuss the community forestry practices Nepal focusing on property rights	Unit 5
Contemporary issues on community-based forestry	Desk review of published literatures, especially peer reviewed literature		Unit 6

KEY REFERENCES

Unit 1

1. Mulder, M. B. & Coppolillo, P. (2005). Conservation: Linking ecology, economics, and culture, Princeton University Press, Princeton.
2. Schlager, E. and Ostrom, E. 1992. Property-rights regimes and natural resources: A conceptual analysis, *Land Economics*, **68** (3).

Unit 2

1. Fabricius, C. & Koch, E. (2004). Rights, resources, and rural development, Earthscan, USA
2. Gomez-Baggethun, E., Corbera, E. & Reyes-Garcia, V. (2013). Traditional ecological knowledge and global environmental change: research findings and policy implications, *Ecology and Society* **18**(4): 72
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Unit 3

1. Nath, T. K. (2009). Participatory forest management and livelihoods of ethnic people: Empirical analysis from Bangladesh, Nova Science Publishers, Inc.
2. Bebbington, A. (2017). Capitals and capabilities: A framework for analyzing peasant viability, rural livelihoods and poverty, *World Development*, **27** (12).

Unit 4

1. Cox, M., Arnold, G., & Tomás, S. V. (2010). A review of design principles for community-based natural resource management. *Ecology and Society*, **15**(4).
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Unit 5

1. Jong, W. (2012). Discourses of community forestry, In B. Arts, S. Bommel, M. Ros-Tonen and G. Verschoor (eds.), *Forest-people Interfaces: Understanding community forestry and biocultural diversity*, Wageningen Academic Publishers: 107-120.
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Unit 6

1. Jong, W. (2012). Discourses of community forestry, In B. Arts, S. Bommel, M. Ros-Tonen and G. Verschoor (eds.), *Forest-people Interfaces: Understanding community forestry and biocultural diversity*, Wageningen Academic Publishers: 107-120.
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4. FAO & UNEP, (2020). The State of the World's Forests 2020. Forests, biodiversity and people, Rome.
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COURSE TITLE: FOREST TENURE AND GOVERNANCE

Course Code	Credit	Lecture Hours (Theory + Practical)	Total Marks (External/final + Internal)
SFM 608	3	48 (32+16)	75 (45+30)

Note: 1 credit= 15 lecture hours

SCOPE: This course intends to familiarize the students on the conceptual/theoretical aspects of forest tenure and governance and provide practical and policy insights drawing examples of different forest management modalities being practiced in Nepal and outside.

OBJECTIVES: At the end of the course, students are expected to:

- Understand the theoretical concepts of forest tenure and governance and explain how these two concepts are interrelated and it is important to understand forest governance.
- Assess the different forest tenure arrangements (government-managed forests, different forms of community-managed forests) based on the bundle of rights provided to local communities.
- Understand and apply key governance indicators across different community-based forest management regimes (modalities) in Nepal.
- Relate Nepal's decentralized forest governance in relation to similar arrangements across the globe, particularly in the Global South.
- Assess the outcomes (ecological, socio-cultural, and economic) of different tenure and governance arrangements taking examples from Nepal.

LEARNING OUTCOMES: Upon the completion of this course students will

- Develop conceptual and theoretical understanding and practical insights into forest tenure and governance using examples from Nepal and across the globe.

COURSE CONTENTS

UNIT 1: CONCEPTS (4)

- 1.1 Decentralization and Devolution in Forest Management
- 1.2 Concept of Governance and Forest Tenure in Relation to Decentralized Forest Governance
- 1.3 Dimensions of Forest Tenure: a) Bundler of Rights, b) Pattern of Ownership, and c) Basis of these Rights
- 1.4 *De facto* and *de jure* Property Rights in the Context of Decentralized Forest Governance
- 1.5 Forest Tenure and Governance Outcomes (forest resources, livelihoods, and human wellbeing)

UNIT 2: FOREST GOVERNANCE (8)

- 2.1 Forest Tenure Regimes
- 2.2 Changing Global Forest Governance – with respect to Forest Tenure Reform
- 2.3 Community-based (decentralized) Forest Governance in Global Context

- 2.4 Global Context of Private and/or Family Forest Management Practices
- 2.5 Questions of Indigenous and Local Rights Over Forest and the Role of Local/Community Rights in Local Livelihoods
- 2.6 History of Forest Tenure and Governance in Nepal
 - 2.6.1 Indigenous Management Practices and Community Rights
 - 2.6.2 Nationalization of Forest and Implications to Local Rights
- 2.7 Trajectory of Policy Development Towards Decentralized Governance and Local/Community Rights - Nationalization of Forests
 - Initiation of Decentralization (Roles of Panchayat)
 - Community Institution Building (1980s)

UNIT 3: COMMUNITY DYNAMICS AND INSTITUTIONAL ARRANGEMENTS (8)

- 3.1 Legal Arrangements and Local Rights (legal provisions to hand over rights) focusing on Community-based Forest Management (CBFM) Models
- 3.2 Community Dynamics (nature of the community, heterogeneity, differential forest-people relations)
- 3.3 Institutional Arrangements (forest user groups, decision-making and local autonomy, management planning)
- 3.4 Stakeholders in Nepal Forest Governance
 - 3.4.1 Role of State in Decentralized Forest Governance– Level of Autonomy and Control (regulations)
 - 3.4.2 External Support (donor funding)
 - 3.4.3 Commercialization (enterprise and engagement with market)
- 3.5 Gender and Equity Issues in Nepal’s Forest Governance

UNIT 4: ASSESSING FOREST GOVERNANCE IN COMMUNITY-BASED FOREST MANAGEMENT MODELS (4)

- 4.1 Indicators to Assess Forest Governance (good governance)
- 4.2 Monitoring and Local Collective Action
- 4.3 Equity and Social Justice in Forest Governance (procedural and distributive issues – participation and inclusion, and distribution of benefits)

UNIT 5: COMMUNITY COLLECTIVE ACTION AND FOREST GOVERNANCE IN THE CHANGING CONTEXT (8)

- 5.1 Patterns of Changes in the Socio-Economic (demography and labour), Ecological Changes
- 5.2 Changing Forest-People Relations and Implications for Forest Management (declining participation, growing human-wildlife conflicts)
- 5.3 Key Challenges of Nepal’s Forest Governance (issue of corruption, stakeholder contestations, bureaucratic control, and community autonomy)
- 5.4 Local Governments and Forest Governance– Role of Local Governments in Community Forestry
- 5.5 Scientific Management in CF and Emerging Issues (elite capture, corruption, bureaucratic influence)
- 5.6 Climate Change and Ecosystem Services (nature-based solutions, carbon trading and watershed services)

PRACTICAL (16)

Assignments/Term Paper

Assign students to write a term paper – focusing on the examination of forest tenure and governance taking example of different community-based governance models. The students will need to review literature (both theoretical and case of specific community-based governance arrangements in Nepal and write a 3000–4000-word essay. Draw literature primarily related to units 2 and 3 but encourage to expand the scope of review.

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
Assessment of the dimensions of tenure in different community-based forest management models	Group work to assess key community-based governance models against the bundle of rights (3-4 groups will explore 3-4 governance models using all domains)	Review of policy arrangement and institutional mechanisms Develop a review matrix and present it in the class and deliver a report (2000-2500 words)	Unit 2, 3
Governance assessment of CBFMs – field/excursion	Develop key governance indicators for community-based forest management	Visit forest user groups and access governance– write report and present	Unit 4

KEY REFERENCES

Unit 1

1. Sikor, T., He, J. U. N., & Lestrelin, G. (2017). Property rights regimes and natural resources: a conceptual analysis revisited. *World Development*, 93, 337-349. <https://doi.org/10.1016/j.worlddev.2016.12.032>.
2. Agrawal, A., & Ostrom, E. (2001). Collective action, property rights, and decentralization in resource use in India and Nepal. *Politics & Society*, 29(4), 485-514.
3. Arts, B., & Visseren-Hamakers, I. (2012). Forest governance: a state of the art review. *Forest-people interfaces*, 239-257.
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COURSE TITLE: POLITICAL ECOLOGY

Course Code	Credit	Lecture Hours (Theory + Practical)	Total Marks (External/final + Internal)
SFM 609	3	48 (32+16)	75 (45+30)

SCOPE: Political ecology, the politics of human relationships with the environment, broadly defined, is an interdisciplinary field that emerged in the 1980s out of Marxian political economy, against over-simplified, neo-Malthusian explanations of environmental problems and views of environmental problems as purely technical or managerial issues. The course aims to introduce students to the diverse concepts under the broader canvas of political ecology and provide students a working fluency in various approaches to issues of environmental politics, policy and management.

OBJECTIVES: After the completion of the course, the students will be able to:

- Understand the concept of political ecology and trace its theoretical foundation and trajectory.
- Be able to provide an alternative explanation to the changing dynamics of human-society relations and the escalating issue of commodification of nature, environmental degradation and differential impacts.
- Explain natural resource management policies and practices using political ecology lens focusing on resources management related challenges/problems and potential solutions.
- Examine the cases of resource management and governance in Nepal such as participatory conservation, community forestry, water resources management and climate change mobilizing political ecological perspective.

LEARNING OUTCOMES: Upon finishing the course, students will be able to

- Understand the concept and evolution of political ecology
- Develop ability to offer alternative interpretations of human-environment dynamics
- Develop critical and analytical perspective on natural resource management policies and practices.

COURSE CONTENTS

UNIT 1: ORIGIN AND CONCEPTS OF POLITICAL ECOLOGY (5)

- 1.1 Political Ecology Overview: Concept, Theoretical Foundation
- 1.2 Alternative Explanation to Environmental Degradation and Consequences – Political Explanation to the Environmental Issues
- 1.3 Science/Ecology in Political Ecology (using examples of forestry and environmental science)
- 1.4 Himalayan Political Ecology

UNIT 2: POWER, POLITICS, SOCIAL CHANGE (6)

- 2.1 Theorizing Power in Political Ecology
- 2.2 Power, Hegemony and Society

- 2.3 Power, Representation and Subjectivity
- 2.4 Feminist Perspective to Power and Situated Knowledge
- 2.5 Power Relation and its Influence in NR Policy Making Process
- 2.6 Knowledge/Power Nexus

UNIT 3: NEOLIBERALISM, NATURE, AND COMMODIFICATION (5)

- 3.1 Neoliberalism, Neoliberal Development and Markets
- 3.2 Resource Extraction and Commodification of Nature
- 3.3 Neoliberal Conservation (political ecology of bio-diversity conservation)
- 3.4 Climate Change and Market Based Solutions
- 3.5 Role and State in Conservation and Forest Management

UNIT 4: DISCOURSES, LOCAL/TRADITIONAL KNOWLEDGE AND COMMUNITY PARTICIPATION (5)

- 4.1 Discourses and Production of Nature
- 4.2 Commoning and Collective Action
- 4.3 Common Property and Commodification of Nature (a case of scientific forest management and REDD+)
- 4.4 Political Ecology of Indigenous Knowledge and Resource Management Practices

UNIT 5. POLITICAL ECOLOGICAL INQUIRIES OF NRM IN NEPAL (6)

- 5.1 Community-Based Development, Community Economies and Wellbeing
- 5.2 Agrarian Change and Peasant Politics
- 5.3 Participatory Development and Politics Of Participation
- 5.4 Resource Conflicts and Social Movements
- 5.5 Climate Change, REDD and Local Livelihoods (synergy and tradeoffs)
- 5.6 Biodiversity Conservation – Human Wildlife Conflict, Changing Land Use Practices and Migration
- 5.7 Community Forestry – Livelihoods and Forest Restoration (who wins and who loses)

UNIT 6: POLITICAL ECOLOGY IN PRACTICE (5)

- 6.1 Community Forestry and Forest Management – Centralization Power and Question Of Local Control and Equitable Benefits
- 6.2 Water Governance, Conflict and Question of Equity
- 6.3 The Political and Ecological Questions Related to Energy Transitions
- 6.4 Infrastructure in the Era of Climate Change (a political ecological critique)
- 6.5 Climate Change Adaptation – Multi-Scale Politics and Messy Practices
- 6.6 Community-Based Conservation – a Critical Reflection (top down vs. bottom up)

PRACTICALS (16)

Each student will be assigned the case study related to biodiversity conservation, forest management, water resource management and climate change adaptation/REDD+. Each of them will be asked to prepare a term paper using political ecology approach and submit the term paper for evaluation by the instructor, and also present among the students and faculty.

Case studies will be related to the following topics:

- Taungya plantation and politics of land control
- Scientific forest management – can we explain the process of reterritorialization and resource control.
- Climate change – how knowledge and power play out in climate change policy and practices.
- Water governance and question of access
- Politics of EIA preparation and implementation
- Forest restoration – why we are so obsessed about tree planting and what can be the alternative.
- Tripling/Doubling tiger population but with what costs?

KEY REFERENCES

Unit 1

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Unit 2

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Unit 3

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Unit 4

1. Beitzl, C.M. (2012). Shifting policies, access and the tragedy of enclosures in Ecuadorian mangrove fisheries: towards a political ecology of the commons. *Journal of Political Ecology* 19: 94-113.
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Unit 6

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COURSE TITLE: SUSTAINABLE FOREST MANAGEMENT

Course Code	Credit	Lecture Hours (Theory + Practical)	Total Marks (External/final + Internal)
SFM 610	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: The course focuses on the integration of social, economic, and ecological aspects while managing forests. It emphasized the development of skills and knowledge required for responsible forest managers focusing on fulfilling the social requirements while managing forests given the condition that the ecological integrity of forests will be maintained and management benefits exceed the costs. The course also covers the issues in forest sustainability and social aspects of forest management so that the interests of different stakeholders of the forestry sector can be addressed.

OBJECTIVES: The general objective of this course is to equipped graduates helping to address complex challenges for sustaining the world's forests while fulfilling diverse societal needs.

The specific objectives are to:

- Understand the diverse role of forests and stakeholders
- Develop skills in engaging concerned stakeholders in forest management
- Adapt forest management strategies based on changing conditions and available information

LEARNING OUTCOMES: After the completion of this course, the students will:

- Acquire a deep understanding of the principles of sustainable forestry, and the interplay of social, economic, and ecological factors of forest management
- Be equipped to engage with local communities, indigenous peoples, women, and other stakeholders in the forest management decision-making process
- Develop advocacy skills for sustainable forest management in their practices
- Understand the role of cost-effective silviculture in sustainable forest management

COURSE CONTENTS

UNIT 1: CONCEPT AND PRINCIPLES (6)

- 1.1 Sustainability in Forestry: Theory and a Historical Case Study
- 1.2 Criteria and Indicators for Sustainable Forest Management
- 1.3 Sustainable Forest Management Framework and Agreements
- 1.4 Forests and Sustainable Development Goals

UNIT 2: MANAGING FORESTS (8)

- 2.1 Silviculture for Sustainable Forest Management
- 2.2 Silviculture Applications for Forest Management Objectives
- 2.3 Forest Regeneration
- 2.4 Yield Regulation (Growing Stock, Rotation, Normal Forest)

UNIT 3: SOCIO-ECONOMIC ASPECTS OF FOREST MANAGEMENT (6)

- 3.1 Stakeholder Engagement in Forestry
- 3.2 Indigenous and Local Community Rights
- 3.3 Gender in Forest Management
- 3.4 Poverty-Forests Nexus
- 3.5 Employment and Local Livelihoods
- 3.6 Social and Cultural Consideration in Forest Management

UNIT 4: FOREST MANAGEMENT PLAN (4)

- 4.1 Components of Forest Management Plan
- 4.2 Data Requirements: Biophysical and Social
- 4.3 Alternative Analysis / Decision Making Model
- 4.4 Monitoring and Evaluation

UNIT 5: ISSUES IN FOREST SUSTAINABILITY (4)

- 5.1 Drivers of Deforestation and Forest Degradation
- 5.2 Forest Governance
- 5.3 Safeguards (Environmental and Social)
- 5.4 Anticipating and Addressing Future Challenges in SFM
- 5.5 Global Perspective on Future of Forests

UNIT 6: APPROACHES TO SUSTAINABLE FOREST MANAGEMENT (4)

- 6.1 Ecosystem Based Management
- 6.2 Community Based Forest Management
- 6.3 Forest Certification
- 6.4 Reduced Impact Logging

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
Measuring the sustainability of forests based on SFM criteria and indicators	Checklist	Visit nearby forests, focus group with community/managers, review documents	Unit 1, 3
Review of CF operational plan	Checklist	Class Discussion/ Presentation	Unit 2, 3
Issues of Sustainable Forest Management	Excursion	Discussion with different stakeholders (groups) and prepare a report	Unit 4, 5
Logging Planning	Literature/Observation	Presentation	Unit 6

KEY REFERENCES

Text Books

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Unit 1

1. Aryal, K., Laudari, H. K., & Ojha, H. R. (2020). To what extent is Nepal's community forestry contributing to the sustainable development goals? An institutional interaction perspective. *International Journal of Sustainable Development & World Ecology*, 27(1), 28-39.
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Unit 2

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Unit 3

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Unit 4

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Unit 5

1. Hosonuma, N., Herold, M., De Sy, V., De Fries, R. S., Brockhaus, M., Verchot, L., ... & Romijn, E. (2012). An assessment of deforestation and forest degradation drivers in developing countries. *Environmental research letters*, 7(4), 044009.
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Unit 6

1. Kangas, J. (1994). An approach to public participation in strategic forest management planning. *Forest ecology and management*, 70(1-3), 75-88.
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COURSE TITLE: PROJECT MANAGEMENT (OPTIONAL)

Course Code	Credit	Lecture Hours (Theory + Practical)	Total Marks (External/final + Internal)
SFM 612	3	48 (32+16)	75 (45+30)

Note: 1 credit= 16 lecture hours

SCOPE: The objective of this graduate-level course is to provide students with a thorough understanding and practical abilities in the management of development projects, both nationally and donor-driven. The course will mainly focus on projects related to the conservation and management of natural resources in Nepal. By following a well-organized curriculum, students will gain a deep understanding of the intricate process of harmonizing national priorities, donor objectives, and community needs. This will equip them with the necessary skills to pursue careers in the sectors of sustainable development, conservation, and project management.

OBJECTIVES: The objective of this course are to:

- Acquire knowledge in setting project goals, incorporating stakeholder interests, and effectively managing personnel.
- Enhance skills in strategic analysis, project identification, and proposal crafting that are in line with national policies and donor requirements.
- Understand Nepal's fiscal policies, donor funding mechanisms, and project appraisal techniques.
- Acquire knowledge about strategies for assessing risks, promoting diversity, managing conflicts, and fostering effective communication among stakeholders.
- Acquire the expertise to assess project success, impact evaluation, and comprehensively document outcomes.

LEARNING OUTCOMES: Upon successful completion of this course, students will

- Be equipped with the necessary skills and knowledge to navigate the complexities of managing national and donor-driven development projects, particularly in the natural resource conservation and management initiatives in Nepal.
- Acquire necessary skills to contribute effectively to sustainable development goals, conservation efforts, and socioeconomic advancements in Nepal through strategic project management practices.
- Understand stakeholder engagement and collaboration strategies for successful project implementation

COURSE CONTENTS

UNIT 1: UNDERSTANDING PROJECT MANAGEMENT IN THE 21ST CENTURY (5)

- 1.1 Evolution and Importance of Projects
- 1.2 Project Management vs. General Management: Key Differences
- 1.3 Taxonomy of Project: Fundamental Elements, Theory of Change
- 1.4 Project and Sustainable Development: Balancing Conservation and Community Needs
- 1.5 The Process of Project Management

UNIT 2: PROJECT ENVIRONMENT AND SCOPE (6)

- 2.1 Project Environment: Political, Environmental, Social, Technical, Legal and Economic
- 2.2 Project Identification: Problem Analysis and Needs Assessment
- 2.3 Project Life Cycle (Initiation, Planning and Implementation) Phase
- 2.4 Defining Project's Vision, Mission, Goals, and Objectives
- 2.5 Writing Project Proposals

UNIT 3: PROJECT PLANNING (6)

- 3.1 Develop a Project Management Plan
- 3.2 Project Schedule: Define Activities and their Sequence and Control
- 3.3 Resource Planning
- 3.4 Budget Planning
- 3.5 Human Resource Planning: Engaging Project Staff, Communities, Stakeholders, and Experts

UNIT 4: UNDERSTANDING FISCAL POLICY AND FINANCIAL APPRAISAL (4)

- 4.1 Nepal Government's Fiscal Policies for Project Appraisal
- 4.2 Financing Mechanisms: Grants, Investments, and Public-Private Partnerships
- 4.3 Financial Appraisal: Cost-Benefit Analysis and Sustainability

UNIT 5: RISK ANALYSIS, DIVERSITY, AND CONFLICT MANAGEMENT (5)

- 5.1 Risk Assessment: Environmental, Social, and Economic Considerations and Risk Assessment Process
- 5.2 Leveraging Diversity: Collaborative Efforts and Community Inclusion
- 5.3 Conflict Management Strategies: Addressing Stakeholder Concerns and Resolving Disputes
- 5.4 Project Risk Management in Different Project Phases
- 5.5 Effective Communication Strategies
- 5.6 Contingency Plan

UNIT 6: MONITORING, EVALUATION, AND DOCUMENTATION (6)

- 6.1 Government Monitoring and Evaluation Strategies for Natural Resources Projects
- 6.2 Project Evaluation: Indicators and Baselines, Result (Logical) Framework and Gantt Charts, Impact Evaluation Design and Methods
- 6.3 Project Knowledge: Documents, Successes, Challenges, Best Practices, and Lessons Learnt
- 6.4 Project Audits

PRACTICAL (16)

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
A two-day field excursion to observe ongoing restoration initiatives and assess project implementation according to its objectives. (8)	Field excursion	Stakeholder discussions	Unit 1,2,3,4 and 5
A half-day visit to an I/NGO that implements forest restoration projects to learn about the dynamics of partnership, coordination mechanisms, and successful grant strategies and review of a project document. (4)	Office visit	Discussion and documentation of the process	Unit 1,2,3,4 and 5
Students (in groups) will develop case studies based on fieldwork and I/NGO visits, focusing on projects, stakeholder engagements, financial management, risk assessments, monitoring and evaluation practices, and project management lessons learned. (4)	Documents	Group reflection and presentation	Unit 1,2,3,4 and 5

KEY REFERENCES

Unit 1

1. Buddhi Man Shrestha. 2023. Project management: theory and practice. Kathmandu, Nepal. (Chapter 1)
2. Harold Kerzner. 2017. Project management: a systems approach to planning, scheduling, and controlling. 12th edition. John Wiley & Sons, Hoboken, New Jersey, USA. (Chapter 1, 2)
3. John Rieger, John Stanley, and Ray Traynor. 2014. Project planning and management for ecological restoration. Society for Ecological Restoration, Island Press, USA. (Chapter 1)
4. Project Management Institute. 2017. A guide to the project management body of knowledge (PMBOK guide). 6th edition. Project Management Institute, USA. (Chapter 1)

Unit 2

1. Shrestha, B.M. (2023). Project management: theory and practice. Kathmandu, Nepal. (Chapter 1)
2. Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. John Wiley & Sons. (Chapter 1, 2)
3. Rieger, J., Stanley, J., & Traynor, R. (2014). *Project planning and management for ecological restoration* (pp. 7-11). Washington, DC: Island Press. (Chapter 2, 3)
4. Guide, P. M. B. O. K. (2008). *A guide to the project management body of knowledge*. (Chapter 2)

Unit 3

1. Shrestha, B.M. (2023). Project management: theory and practice. Kathmandu, Nepal. (Chapter 2)
2. Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. John Wiley & Sons. (Chapter 11)
3. Guide, P. M. B. O. K. (2008). *A guide to the project management body of knowledge* (Chapter 4, 6, 7, 9)

Unit 4

1. Shrestha, B.M. (2023). Project management: theory and practice. Kathmandu, Nepal. (Chapter 3)

Unit 5

1. Shrestha, B.M. (2023). Project management: theory and practice. Kathmandu, Nepal. (Chapter 3)
2. Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. John Wiley & Sons. (Chapter 1, 2)
3. Guide, P. M. B. O. K. (2008). *A guide to the project management body of knowledge*. (Chapter 2)

Unit 6

1. Shrestha, B.M. (2023). Project management: theory and practice. Kathmandu, Nepal. (Chapter 1)
2. Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. John Wiley & Sons. (Chapter 1, 2)
3. Rieger, J., Stanley, J., & Traynor, R. (2014). *Project planning and management for ecological restoration* (pp. 7-11). Washington, DC: Island Press. (Chapter 2, 3)

**COURSE TITLE: NATURAL RESOURCE PROFESSIONAL ETHICS
(OPTIONAL)**

Course Code	Credit	Lecture Hours (Theory + Practical)	Total Marks (External/final + Internal)
SFM 606	3	48 (32+16)	75 (45+30)

Note: 1 Credit= 16 Lecture Hours

SCOPE: This course focuses on the ethical aspects of the delivery of professional services in the field of natural resource management. It emphasizes the importance of conducting one's work in a just, fair, and ethically responsible manner, especially when balancing the demands of resource conservation and the fulfillment of legitimate human needs. The course offers valuable guidance on how to navigate these complex ethical dilemmas and make decisions that align with a strong moral and environmental compass. Students will gain the knowledge and skills necessary to address these issues in a professional and responsible manner, ensuring sustainable management of natural resources for the benefit of current and future generations.

OBJECTIVES: Upon completion of the course, students will have acquired a deep understanding of professional ethics in natural resource management and developed the ability to apply ethical principles to real-world challenges in this field, leading to responsible and sustainable resource management practices. The specific objectives are:

- Students will demonstrate a comprehensive knowledge of historical and contemporary ethical frameworks in the management of natural resources, allowing them to recognize ethical dilemmas and principles in this context.
- Students will develop problem-solving skills to address practical ethical challenges through case analysis, discussions, and group work within a professional setting.
- Students will cultivate a personal commitment to ethical conduct and develop a code of professional behavior consistent with the principles of professional ethics in the management of natural resources.

LEARNING OUTCOMES

- **Ethical competence:** Graduates will have a strong ethical foundation and deep understanding of professional ethics in natural resource management, enabling them to navigate complex ethical challenges in their careers.
- **Problem-solving:** Graduates will demonstrate the ability to effectively address practical ethical dilemmas within the field of natural resource management, employing analytical skills and critical thinking to develop sound ethical solutions.
- **Personal ethical commitment:** Graduates will cultivate a personal code of professional conduct consistent with the principles of professional ethics in natural resource management, reflecting a commitment to ethical behavior in their careers.

COURSE CONTENTS

UNIT 1: INTRODUCTION (4)

- 1.1 Define Ethics, Areas of Ethics (meta, normative, and applied), Norms and Values.
- 1.2 Applied Ethics Approaches (utilitarianism, deontological, virtue) and Major Subfields.
- 1.3 Profession, Professionalism, Professional Ethics, and Professional Practice.
- 1.4 Developing Professional Ethical Reflections on Natural Resource Management.

UNIT 2: NATURE AND ETHICS (8)

- 2.1 Rights of Trees and Nature, Animal Rights and Welfare.
- 2.2 Definition, Types, Principles and Importance of Environmental Ethics in Nature Conservation and Protection.
- 2.3 Anthropocentrism vs. Ecocentrism Views on Nature.
- 2.4 Environmental Justice: Concept of Justice and Fairness, Distributional Inequality and Environmental Injustice, Interlinkage Between Environmental Ethics, Social Justice and Sustainable Resource Management.

UNIT 3: PROFESSIONAL ETHICS (8)

- 3.1 Loyalty to Employer, Responsibility and Duty, Confidentiality and Proprietary Information, Occupational Safety and Ethics, Digital and Cyber Ethics Including the Use of Robotics and Artificial Intelligence (AI)
- 3.2 Public Duties: Moral Obligations of Government Servants, NGOs, INGOs and Other Public Institutions, Professional Consulting and Advertising
- 3.3 Conflicts of Interest in Decision Making: Recognizing and Resolving Conflicts of Interest in Professional Judgments in Natural Resources Management
- 3.4 Program Operation and Activities: Institutional Ethical Board/Committee, Code of Conduct, Program Activity Plans and Inclusiveness, Prior Informed Consent, Request for Permission

UNIT 4: ETHICAL DECISION-MAKING METHODS AND TOOLS (6)

- 4.1 Methods: Situation Analysis, Moral Reasoning, Practical Reasoning, Precautionary Principle
- 4.2 Tools: Ethics Codes and Professional Standards; Compliance with Laws, Regulations and Standards; Code of Conduct; and Ethical Checklists
- 4.3 Audits: Social Audit, Social Media Audit

UNIT 5: ETHICAL ISSUES AND DILEMMAS (6)

- 5.1 Ethical Issues: Corruption, Lack of Transparency, Prioritizing Private Interests Over Public Good, and Influence of Special Interests and Politics on Policies
- 5.2 Ethical Dilemmas: Balance Economic Interests with Conservation, Managing Competing Demands on Land Resources, Weighing Single vs. Multiple Values in Forests, and Conflicts between Short-term and Long-term Goals

PRACTICAL (16)

At least two practical tasks (1 individual and 1 group work) must be performed, and the instructor of the course should organize a workshop in which students present their individual assignments.

- **Ethical reflection paper (Individual):** This assignment encourages students to engage in individual ethical reflection on a specific interest, aligning their personal ethical values with the course's ethical principles.
- **Role-play scenario (Group):** Through this group assignment, students will investigate ethical dilemmas within various environmental philosophies, allowing them to apply ethical principles in a practical context.
- **Conflict resolution (Individual):** By providing students with a real case of conflict of interest in resource management, this assignment assesses their ability to recognize and manage conflicts of interest in a professional context.
- **Situation analysis (Group):** Student groups engage in situation analysis by examining real-world case studies with ethical dilemmas. This promotes their practical skills in ethical decision-making.
- **Professional ethics workshop (Individual/Group):** Student groups organize and conduct a workshop on professional ethics in natural resource management, providing an opportunity for them to demonstrate and share their understanding of the course's ethical principles and their practical application by presenting their ethical reflection paper.

Contents	Equipment/tools	Methodology/methods	Link to Unit(s)
Ethical reflection paper (individual)	A case for a student	Review of the literature	Unit 1, 2, 3, 4, 5
Role-play scenario (group)	Ethical dilemmas and environmental philosophy	Assign student groups a role-play scenario on an ethical dilemma using environmental philosophy	Unit 2
Conflict resolution (individual)	Cases of conflict of interest, one per student	Provide real cases of conflict of interest in resource management and guide students in solving it	Unit 3
Situation Analysis (Group)	Ethical dilemmas in decision-making in resource conservation	Provide student groups with real-world case studies that involve ethical dilemmas in decision-making	Unit 4
Professional ethics workshop	Space for workshops, audiovisual aids	The teacher/students organize an in-house presentation workshop on professional ethics in natural resource management, and students present their individual assignment	Unit 1, 2, 3, 4, 5

KEY REFERENCES

Unit 1

1. Irland, L.C. (2007). Professional Ethics for Natural Resource and Environmental Managers: A Primer. Yale School of Forestry & Environmental Studies, Forestry & Environmental Studies Publications Series. 7. [Chapter 1, 2]
2. Jamieson, D. (2008). Ethics and the environment: an introduction. Cambridge University Press. United Kingdom. www.cambridge.org/9780521864213. [Chapter 1]
3. Kelly, T.M. (2018). Professional ethics: a trust-based approach. Lexington Books, London. [Chapter 1]
4. Airaksinen, T. (2012). Professional Ethics: Ruth Chadwick, Encyclopedia of Applied Ethics (Second Edition), Academic Press, Pages 616-623. ISBN 9780123739322. <https://doi.org/10.1016/B978-0-12-373932-2.00080-6>.

Unit 2

1. Jamieson, D. (2008). Ethics and the environment: an introduction. Cambridge University Press. United Kingdom. www.cambridge.org/9780521864213 [Chapter 1, 6]
2. Lee, W. N. (2022). This is environmental ethics: an introduction. John Wiley and Sons Ltd. United Kingdom. [Chapter 1, 6]
3. Mohai, P., Pellow, D. & Roberts, J.T. (2009). Environmental justice. *Annual Review of Environment and Resources*, 34, pp.405-430. <https://doi.org/10.1146/annurev-environ-082508-094348>
4. Hale, B., Light, A., & Lawhon L. A. (2023). The Routledge Companion to Environmental Ethics. Taylor and Francis, New York and London. [Chapter 1, 5, 63]

Unit 3

1. Irland, L.C. (2007). Professional Ethics for Natural Resource and Environmental Managers: A Primer. Yale School of Forestry & Environmental Studies, Forestry & Environmental Studies Publications Series. 7 [Chapter 6 to 10]
2. Kelly, T.M. (2018). Professional ethics: a trust-based approach. Lexington Books, London. [Chapter 3, 6]
3. Meyers, C. (2018). The professional ethics toolkit. John Wiley and Sons Ltd. United Kingdom. [Chapter 6-8]
4. Airaksinen, T. (2012). Professional Ethics: Ruth Chadwick, Encyclopedia of Applied Ethics (Second Edition), Academic Press, Pages 616-623. ISBN 9780123739322

Unit 4

1. Meyers, C. (2018). The professional ethics toolkit. John Wiley and Sons Ltd. United Kingdom. [Chapter 2, 9]
2. Lee, W. N. (2022). This is environmental ethics: an introduction. John Wiley and Sons Ltd. United Kingdom. [Chapter 1]
3. Hale, B., Light, A., & Lawhon L. A. (2023). The Routledge Companion to Environmental Ethics. Taylor and Francis, New York and London. [Chapter 58]

Unit 5

1. Jamieson, D. (2008). Ethics and the environment: an introduction. Cambridge University Press. United Kingdom. www.cambridge.org/9780521864213 [Chapter 6]
2. Meyers, C. (2018). The professional ethics toolkit. John Wiley and Sons Ltd. United Kingdom. [Chapter 9]
3. Hale, B., Light, A., & Lawhon L. A. (2023). The Routledge Companion to Environmental Ethics. Taylor and Francis, New York and London. [Chapter 54-56]

SEMESTER IV

SFM 651	Proposal
SFM 652	Pre-defense
SFM 699	Dissertation
SFM 653	Manuscript of Research Work

