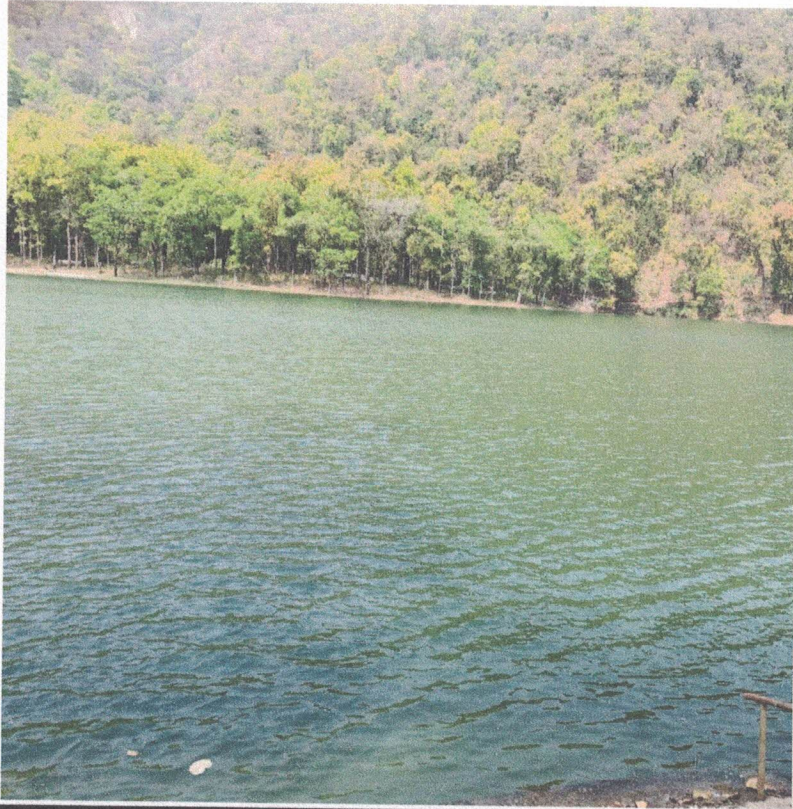


2023



Course Curriculum for Undergraduate Program in Forestry (Bachelor of Science in Forestry)



Far Western University
Mahendranagar, Nepal
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Curriculum for Bachelor of Science in Forestry
(BSc in Forestry)

Submitted to
Far Western University
Mahnedranager, Nepal

Team Members

Prof. Ridish K. Pokharel, PhD – Chair
Prof. Santosh Rayamajhi, PhD – Member
Prof. Bir Bahadur Khanal, PhD – Member
Prof. Krishna Raj Tiwari, PhD – Member

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INTRODUCTION

It is well-accepted that higher education contributes to the overall development of a country. Higher education has become more important and focused when the United Nations (UN) listed it fourth among the 17 Sustainable Development Goals (SDGs) in 2015 (UN, 2015). The SDG four stands for “equal access to higher education as part of the promotion of life learning opportunities for all”. As a UN member country, Nepal has adopted and incorporated these goals in her development agendas. For example, the country has developed a framework “Nepal National Framework of SDG 4: Education 2030” to achieve the targets of SDG 4 (MOEST, 2019). Similarly, National Education Policy (2019) has also been implemented to improve access to quality education and increase the relevance of higher education to national priorities and sustainable development. The policy encourages expanding higher education across the country focusing to technical education (MOEST, 2019a).

Forestry as a technical discipline, deals with environmental problems and contribute to the solution as well. Environmental problems are both national and global concern and seen them as the problem of ‘global commons’ (World Bank, 1999). The protection of global commons against the problem is necessary for sustainable development. The SDG 13, 14, and 15 deals with the protection of global commons (UN, 2015; FRTC, 2019). With the inclusion of these goals in the SDGs, forestry education has become more important. Far Western University (FWU), one of the government-funded universities located in Far Western Province, diversified its academic programs for starting forestry at bachelor level. To effectively implement the bachelor’s in forestry program (BSc Forestry, a set of courses (curriculum) has been structured incorporating current trends and compulsory requirements.

BSc FORESTRY PROGRAM

BSc Forestry is a four-year (eight-semester) program with the course of 16 weeks per semester of course work degree. The program requires the students to study a total of 126 credit hours for obtaining bachelor’s degree in forestry known the degree as ‘Bachelor of Science in Forestry (BSc in Forestry)’. The curriculum of the program is designed to prepare well-rounded foresters with knowledge, skills, values in the art, business, and science of forestry. Moreover, the curriculum offers students to choose their degree within four major subjects or in general area. The general degree will be awarded as BSc in Forestry and the degree with major in four different areas i.e., forest management, wildlife, watershed, forest utilization (NTFPs) as BSc in Forest Management, BSc in Forest Utilization (NTFPs), BSc in Wildlife Conservation, and BSc in Watershed Management. To get awarded the degree with the major subject area, students require to complete their both special paper (seminar) and project work/internship works in the same area/field; failing to meet the requirement would lead them to receive the general degree. For example, if the special paper and project work are in different areas/fields, then the student is not eligible to receive the degree with major subject; s/he would receive the general degree i.e., BSc in Forestry.

The curriculum is divided into four major parts consisting of foundation course, core course, applied course, and practicum/internship containing the total of 34 subjects plus field study (ranging from one to three weeks). The curriculum consists of a combination of class lectures, lab works, short excursions, seminars, field study, and internship which provides students an opportunity to understand the field situation and transfer their learned knowledge into practices. Each semester contains class lectures, lab works and short and long excursions depending on the nature of the course except in the

final semester. The final one or eight semester is dedicated to seminar and internship. It is strongly felt that this sort of combinations in pedagogy would create learning environment and allow the students to practice their learned knowledge and skills in the respective field.

THE PROGRAM GOALS AND OBJECTIVES

The BSc Forestry program promotes scientific conservation and management of forests for sustainable use of forest products and services. The main goal of the program is to make forestry graduates competent who can practice forestry profession with integrity in promoting sustainable management of forest resources and ecosystem services and conservation of soil, water, and biodiversity including NTFPs. Moreover, the graduates of the program can work in the specific professions and allied areas such as forest resource inventory, tree and agroforestry farming, nursery management, enterprise development, forest products production and utilization, protected area management, and teaching.

CREDIT HOURS

Each course is assigned certain weightage in terms of credit hour which is an amount of work represented in intended learning outcomes. It is defined as a combination of lecture hour in class and work of student out-of-class (self-study). To achieve intended learning, a student must invest the total of minimum of 45 hours in one semester for one credit course (Figure 1). In other words, student in one credit course requires to work on for one-hour or 50 minutes lecture in class or direct faculty instruction and a minimum of two-hours for self-study each week for 16 weeks for one semester. Similarly, student in three credit course requires to work on for the total of minimum of 135 hours in combination of class time and out-of-class time.

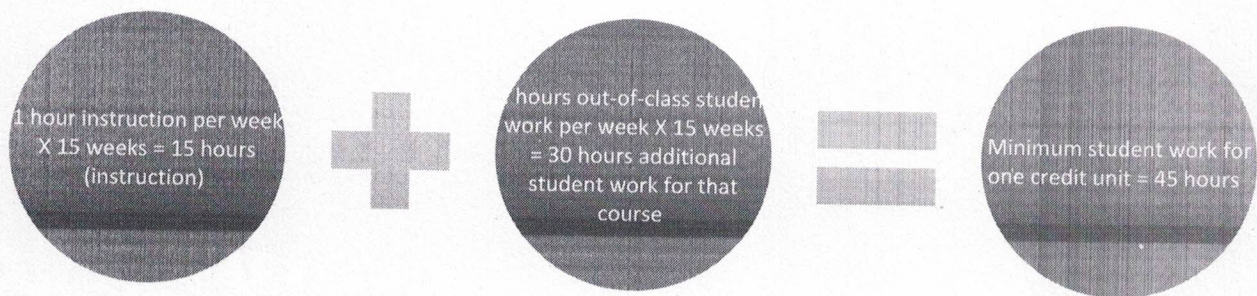


Figure 1. Minimum of total hour required for one credit course

Under this curriculum, the total of 45 contact hours per semester is allocated for one credit course including work of student out-of-classwork. As the credit increases the contact hours also increases in the semester accordingly. For field study or long excursion, six hours per day is considered as class time including work of student out-of-class and spending seven days in the field is equivalent to one credit course. For example, a student with one credit field study/internship/project work must spend seven days in the respective field. In other word, if the students spend seven days in field, then only they are eligible to obtain one credit.

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COURSE CODE

A prefix and number are used as course code to identify the subject area and organize the course. The prefix indicates the abbreviation text of the **Respective Subject Committee** and the number specify the course to be taught in different year or semester. The course number comprises of 201, 301, 401 and 501 which indicates the courses are taught in first-year, second-year, third year, and fourth year, respectively meaning as the number goes higher, courses are taught in upper level such as third year and fourth year. Similarly, the course prefix implies the course falls under the respective subject committee. The meaning of course prefix is illustrated in the table below:

SN	Prefix	Subject Committee	Number of courses
1	FMS	Forest Management and Silviculture	19
2	WEM	Watershed and Environmental Management	07
3	WPM	Wildlife and Protected Area Management	06
4	FPU	Forest Products and Utilization	11

SUBJECTS IN THE CURRICULUM

There are the total of 43 subjects in the curriculum (34 courses, six field studies, two seminars, and one internship). The allocation of the amount of credit in each subject is equal except in field study, seminar, and internship. Some subjects include practical, and the others do not. The subject committees range the courses from 06 to 19. Although some subjects do not include the practical, these subjects offer hands-on application skills during the field study by exposing students in forest field laboratories. Forest field laboratories are an important part of the curriculum and learning experiences. It includes field study/field trip and internship/project work. In the field study, students are taken to different field situations for one-week to three, depending on the objectives and provide an opportunity for students to observe and apply their learned knowledge in the field. Field trips expand the opportunities for students to transfer knowledge (Bransford et al., 2000). Eshach (2007) also argues that field trip offers the opportunity to expose students to learning conditions that simply cannot be replicated in classrooms. In the internship, students are placed in a designated office for 13 weeks or 91 working days, which provides them an opportunity for meaningful career related experiences by working fulltime in real organization setting. The forest field laboratory covers almost one-sixth (17%) of the overall curriculum (seven per cent in field study and ten per cent in internship). In addition, two-third of the curriculum is covered by theoretical class followed by laboratories class (14%) and seminar (2%). Seminar and internship are designed only in the last semester where students are supposed not to take theoretical classes. The main purpose of designing seminar and internship in the last semester is allowing students to devote their time fully in preparing project proposal and plans and execute them accordingly in a working station.

Table below shows the number of subjects included in the curriculum along with the credit hours by semester-wise. Allocated credit hour is almost equal in each semester ranging from 15 to 16 credits per semester. The number before and after plus under the column of credit mentioned in the table below indicates the credit hour allocated for theoretical and practical classes, respectively.

Third Year (1 st Semester)/Fifth Semester			Third Year (2 nd Semester)/Sixth Semester		
Code	Course	Credit	Code	Course	Credit
FMS 401	Forest & Wildlife Law and Policies	3 + 0	FMS 451	Forest Extension and Communication	3 + 0
FPU 402	Principles and Practices of Herbal Cultivation	2 + 1	WPM 452	Nature Based Tourism and Recreation	3 + 0
WPM 403	Wildlife & Biodiversity Conservation and Management	3 + 0	WEM 453	Remote Sensing and GIS	2 + 1
WEM 404	Soil Conservation Engineering and Disaster Management	3 + 0	FPU 454	Herbal Products Processing and Marketing	2 + 1
WEM 405	Watershed Management and Ecosystem Services	2 + 1	FMS 455	Community Based Forestry	3 + 0
WEM 406	Field Study (Watershed and Disaster)	0 + 1	WPM 456	Field Study (Wildlife and PA Management)	0 + 1
Total		13 + 3	Total		13 + 3

Fourth Year (1 st Semester)/Seventh Semester			Fourth Year (2 nd Semester)/Eighth Semester		
Code	Course	Credit	Code	Course	Credit
FPU 501	Project Management and Enterprise Development	3 + 0	FMS 551	Seminar I (Proposal defense)	1 + 0
WPM 502	Protected Area and Landscape Management	3 + 0	FMS 552	Internship/Project Work	0 + 13
WPM 503	IT Application in Forestry and Wildlife Management	2 + 1	FMS 553	Seminar II (Intern/Project Work Defense)	1 + 0
FMS 504	Forest Resource Assessment (IEE/EIA)	2 + 1	Total		2 + 13
FMS 505	Field Study (Forest Management in Nepal and India)	0 + 3			
Total		10 + 5			

FINAL THEORY AND PRACTICAL EXAMINATION/EVALUATION SYSTEM

The program evaluates student's knowledge, ability and competency based on internal and external evaluation systems with the weightage of 40 and 60 per cent, respectively including practical. The program adopts internal evaluation as continuous evaluation and external as final examination. The continuous evaluation uses teaching works, activities, and students' behavior to evaluate student's progress whereas the external evaluation uses written test at the end of the semester, and laboratory works for the practical. The students must secure 40 per cent in internal evaluation to qualify for external evaluation. Similarly, the student must secure 40 per cent marks in theory & practical separately in each subject to pass the examination.

GRADING SYSTEMS

A student will be graded either by number or by letter grade system as per the university's rules. The number or letter grade will be used to grade student from 1 to 4 scale or A to C-: 1 or C- being the lowest and 4 or A being the highest, respectively. The highest grade shows as outstanding performance of student, and the lowest grade shows as poor. The following grading system will be adopted to evaluate students:

Grade	GPA	Equivalent (in %)	Performance
A	4.0	95 per cent and above	Outstanding
A-	3.7	85 to below 95 per cent	Excellent
B	3.4	75 to below 85 per cent	Very Good
B-	3.1	65 to below 75 per cent	Good
C	2.9	55 to below 65 per cent	Satisfactory
C-	2.6	40 to below 55 per cent	Acceptable
F	2.3	below 40 per cent	Failed

ADMISSION REQUIREMENTS

Students who have completed Intermediate of Science or 10 +2 (Science) or Diploma in Forestry or Technical Certificate Level in Forestry or equivalent degree from recognized university/board with the minimum of C grade or 50 per cent marks in aggregate are eligible to apply for BSc Forestry program. The applicants are required to appear in the entrance examination conducted by FWU. The candidates must pass the examination and are selected on merit basis for enrollment in the program. Preferences of girl and candidate with disadvantage group will be given by providing some reserved seats or quota for admission.

TIMEFRAME FOR SEMESTER

There are two semesters in each academic year. One semester covers a period of 90 effective working days of teaching and two weeks for external evaluation. The university prepares academic calendar in the beginning of the academic year and directs the dean office to implement it.

REFERENCES

Bransford, J. D. Brown, A. L. and Cocking, R. 2000. How People Learn: Brain, Mind, Experience, and School, Washington, DC: National Academy Press.

Eshach, H. 2007. Bridging in-school and out-of-school learning: Formal a, non-formal and informal education, *Journal of Science Education and Technology*, **16**: 171 – 190.

FRTC, 2019. Summary of An Assessment of Nepal's Forestry Sector's Contribution to Sustainable Development Goals, Forest Research and Training Center, Babarmahal, Kathmandu, Nepal

MOEST, 2019. National Education Policy 2019, Ministry of Education, Science and Technology, Nepal



MOEST, 2019a. Sustainable Development Goal 4: Education 203 Nepal: National Framework, Ministry of Education, Science and Technology, Kathmandu,

UN, 2015. Transforming Our World: The 2030 Agenda for Sustainable Development General Assembly, *Resolution adopted by the General Assembly on 25 September 2015*, United Nations General Assembly, New York, USA

World Bank, 1999. Entering the 21st Century, World Bank Report, Washington D. C.

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