

CURRICULUM
Technician Level Course
in
Plant Science
(JT)

(One year programme-annual system)



Council for Technical Education and Vocational Training

Curriculum Development Division

Sanothimi, Bhaktapur

Development: 1991 (2048)

First Revision: 1995 (2052)

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1. Introduction

With respect to agriculture training, many changes have occurred in the last few years. Previously JTA training was run by the Department of Agriculture, Tribhuvan University and CTEVT, however, CTEVT has the prime responsibility for this training. CTEVT Act 2049 has given mandate to CTEVT to conduct the TEVT programs. Following the Act, the responsibility of CTEVT has been further developed and set-forth. The primary purpose of CTEVT is "to facilitate the growth and development of human resources of the Nation. Accordingly, one of the specific objectives designed is "to organize and coordinate technical education and vocational training below the bachelor degree level through manpower needs assessment, recognition, accreditation, curriculum development, etc." It is based upon this purpose and objective that this curriculum has been designed to facilitate the growth and development of human resources in Nepal's agriculture sector.

Throughout the world it has been shown that successful vocational training must be closely linked with the actual "job market". In other words, the whole training program must be developed through a process that considers both the needs of the "user-groups" which hire the graduates, and the need for graduates which are "self-employed". The question must be asked, "Which specific skills the graduates need in order to either find employment with various agencies; or to develop their own enterprise?" These skills must be clearly identified and a training program must be initiated to develop them.

In this regard, Koshi Hills Agricultural Development Project was conducted the training needs assessment of technician level (JTs). During this assessment, Director Generals of Horticulture, Food and Agricultural Marketing Services; General managers of the Dairy Development Corporation, Agriculture Inputs Corporation; chiefs of the training wings of the Departments of Livestock Services and Agriculture, Agricultural Development Bank, Regional Directors of Agriculture for Central, Western, Mid-Western, Far-Western Regions, Regional Directors of Livestock for Western and Mid-Western Regions were consulted. After completing all procedures, technician level (JT) curriculum developed in 1991 (2048) and first revised in 1995 (2052) has been implementing till 2015. Department of Agriculture identified the gaps and requested to revise the curriculum in order to fit the constantly changing scenario of agriculture development within the country and to review the role of agriculture technician in Nepal. As a result this curriculum revision work has been done with the technical support of Agriculture Department and other concerned organizations in June 2016.

2. Curriculum Title

Junior Technician (JT) in Plant Science

3. Programme Aims

1. To provide more effective middle-level agricultural extension personnel.
2. To improve the efficiency of the delivery of extension services to rural people.
3. To prepare JTs to start their own small business, or to be able to help farmers who are starting their business.
4. To provide an opportunity for career development and promotion to Agricultural (Plant Science) JTAs.

4. Programme objectives

By the end of the course, the trainees will be able to:

1. Fulfill the technical, administrative and sociological tasks and responsibilities of a Plant Science; JT in Nepal.
2. Work with rural people in a more sympathetic and constructive way to help them to identify their problems and seek their own solutions.
3. Act as a more effective catalyst of change in a rural community-women, as well as men; the poor, as well as the rich; the remote, as well as the centrally-placed-into the development process.
4. Report to superiors clearly and accurately the problems and needs of rural people.

5. Programme description:

This curriculum is designed with the purpose of producing middle level human resources in Agriculture which can provide guidance and support to the agriculture sectors in farmers' level. It will also create employment opportunities and improve equitable livelihood of farmers' especially underprivileged societies by their skill upgrading. The course structure deals with theory and practical aspects of agriculture. The course should reflect the need of present agriculture services, the professionalism in agriculture sector, and the need based curriculum so that the graduates of this course will be readily acceptable by the farmers at community level and the roles and responsibilities of technician to improve the Agriculture economy of the country.

6. Duration:

The total duration of this curricular program is one year. Actual teaching learning weeks are 39 week per year and 40 hours per week. Teaching learning hours will be not less than 1560 hours.

7. Group Size

The group size will be maximum of 40 (forty) in a batch.

8. Entry criteria:

Minimum entry requirements are Technical School Leaving Certificate (TSLC) in Agriculture/ Livestock or equivalent, plus three years' experience in agriculture sector.

9. Selection

Applicants fulfill the entry criteria will be selected only after agreement for their sponsorship.

10. Medium of instruction:

The medium of instruction will be English and/or Nepali for all the subjects.

11. Pattern of attendance:

Minimum of 90% attendance in each subject is required to appear in the respective final examination.

12. Teacher and student ratio:

The ratio between teachers and students must be:

- 1:40 for theory and tutorial classes
- 1:10 for practical classes

13. Teachers and demonstrators:

- The program coordinator must be a master degree holder in related field or bachelor degree in related field with minimum of 3 years teaching experience after completion of the Bachelor degree.
- The faculties must be a bachelor's degree holder.
- The demonstrator should have an intermediate level degree in related subject with minimum of 2 years' experience.
- Minimum 75% faculties must be fulltime.

14. Instructional media and materials:

- **Printed materials:** Assignment sheets, case studies, handouts, performance checklists, textbooks etc.
- **Non-projected materials:** Displays, models, photographs, flipchart, poster, writing board etc.
- **Projected media materials:** Slides, overhead projectors, transparency, opaque projectors etc.
- **Audio-visual materials:** Audio tapes, films, slide-tapes, video disc, video tapes etc.
- **Computer based instructional materials:** Computer based training, interactive video etc.

15. Teaching learning methodologies:

Lecture, group discussion, demonstration, simulation, role play, guided practice, practical work, field visits, laboratory observation and work, report writing, paper presentation, case analysis, tutoring etc. Categorically the teaching and learning methodology will be as follows:

- **Theory:** Lecture, group discussion, assignment and group work.
- **Practical:** Demonstration, observation and self-practice.

16. Mode of education:

There will be inductive and deductive mode of education

17. Examination and marking scheme:

- The subject teacher will internally assess the students' achievement in each subject during the course followed by a final examination at the end of the course.
- Weightage of theory and practical marks will be 20% and 80% respectively
- A weightage of 50% for the internal assessment and 50% for the final examination will be allocated for both theoretical and practical components of a subject.
- The final semester examinations of all theory components will be administered through written tests.
- Generally the method of continuous assessment will be adopted for practical components. Internal marks distribution of the practical works is according to the weightage given to the particular practical work.
- In some cases final examinations are also conducted for practical components as per needs or as mentioned in the subjects (practical).
- Student who fails in the internal assessment will not be allowed to sit in the final examination.
- One evaluator in one setting can evaluate not more than 20 students in a day.
- Practical examination should be administered in actual situation on relevant subject with the provision of at least one internal evaluator from the concerned institute led by an external evaluator nominated by CTEVT.

18. Provision of back paper:

There will be the provision of back paper but a student must pass all the subjects within four years from the enrolment date.

19. Disciplinary and ethical requirements:

- Intoxication, insubordination or rudeness to peers will result in immediate suspension followed by a review by the disciplinary review committee of the college.
- Dishonesty in academic or practice activities will result in immediate suspension followed by an administrative review, with possible expulsion.
- Illicit drug use, bearing arms on campus, threats, or assaults to peers, faculty, or staff will result in immediate suspension, followed by an administrative review with possible expulsion.

20. Pass marks:

The pass marks for theory and practical will be 40 % and 60 % of full marks respectively.

21. Grading system:

The following grading system will be adopted:

- ❖ Distinction: 80% and above
- ❖ First division: 65% to below 80%
- ❖ Second division: 60 % to below 65%
- ❖ Pass division: Pass marks to Below 60%

22. Certification and degree awards:

- ❖ Students who have passed all the components of all subjects are considered to have successfully completed the course.
- ❖ Students who have successfully completed the course will be awarded with a certificate of "**Junior Technician (JT) in Plant Science**"

23. Employment Opportunity:

The graduates would be eligible to work as mid-level technicians (Junior Technician, JT) in department of agriculture services and related sector as prescribed by the Public Service Commission or the concerned authorities.

24. Provision of elective subjects:

There will be no provision of elective subjects in this curricular programme.

COURSE STRUCTURE

	Nature	Hrs/w	Theory hrs	Practical hrs	Total hrs	Theory and Practical Marks Distribution						Full Marks	Remarks
						Internal			Final				
						Th.	Pr.	Total	Th.	Pr.	Total		
Communication	T+P	6	47	187	234	15	60	75	15	60	75	150	
Management	T+P	4	31	125	156	10	40	50	10	40	50	100	
	T+P	2	16	62	78	5	20	25	5	20	25	50	
Project Works	T+P	3	23	94	117	7.5	30	37.5	7.5	30	37.5	75	
Marketing	T+P	2	16	62	78	5	20	25	5	20	25	50	
	T+P	3	23	94	117	7.5	30	37.5	7.5	30	37.5	75	
		20	156	624	780	50	200	250	50	200	250	500	
	T+P	6	47	187	234	15	60	75	15	60	75	150	
	T+P	4	31	125	156	10	40	50	10	40	50	100	
and Nursery	T+P	6	47	187	234	15	60	75	15	60	75	150	
	T+P	4	31	125	156	10	40	50	10	40	50	100	
		20	156	624	780.0	50	200	250	50	200	250	500	
		40	312	1248	1560	100	400	500	100	400	500	1000	

Agricultural Extension, Communication and Rural Development

Credit hours: 6 /week
Total hours: 234
Theory: 47 hrs
Practical: 187 hrs

Full Marks: 150
Theory Marks: 30
Practical Marks: 120

Course Description

This course provides the basic knowledge and skills in communication as an extension worker in a community development program to the students. The course includes own opinion in different sectors and the extension teaching method used in transfer of technology, innovation diffusion, their planning, monitoring and evaluation process. This course also studies sociological concept and importance of community development, group formation and dynamic on social process, motivation, gender development, leadership development, social mobilization and need based training and its importance in agriculture development.

Course Objectives

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

- Develop own concept on agriculture extension.
- Apply the knowledge of extension education in transfer of technology, program planning, monitoring and evaluation of agricultural extension programs.
- State sociological concept and terms with group dynamics, leadership and social mobilization.
- Explain gender and development, type and methods used in need based training to motivate the people in rural development programs.
- Develop the knowledge and skills in identifying social problems, data gathering technique, analysis and presentation.
- Visit different district level line agencies and understand their program, strategy and organizational structure.
- Communicates effectively with individuals and group in variety of setting by using different means of communication.

Skills/Task List	Contents	Teaching Strategy
1. Explain the nature of agricultural information	1.1 Fact v. opinion 1.2 "Right" answer may depend on many factors-scientific, climatic, physical, social, economic, political, religious etc.	Lesson discussion
2. Describe the agricultural information system in Nepal	2.1 Links between farmers' indigenous knowledge, research results, extension etc. 2.2 Agricultural education and training in the information system	Lesson discussion

Skills/Task List	Contents	Teaching Strategies
3. Explain basic concepts of communication	3.1 Communication principles/methods. 3.2 Verbal/Non-verbal communication 3.3 Target audience 3.4 Selecting messages 3.5 Different communication systems.	Lesson, classroom exercise
4. Speak audibly and give clear explanations of process, opinions and events	4.1 Public speaking 4.2 Giving instructions 4.3 Contribute effectively to discussion	Classroom exercise, field exercise
5. Listen effectively to farmers, supervisors etc. and take appropriate action	5.1 Listen to farmers and record important points 5.2 Listen to spoken instructions and carry them out	Classroom exercise, games, field exercise
6. Read and respond to written messages	6.1 Questions, requests 6.2 Instructions, orders	Classroom exercises
7. Write clearly and concisely	7.1 Official letters, memos 7.2 Messages 7.3 Reports	Classroom exercises
8. Explain the group approach to extension	8.1 Basic principles and objectives 8.2 Advantages and disadvantages 8.3 Different types of group <ul style="list-style-type: none"> – users' group – commodity group – others 8.4 Different roles of groups <ul style="list-style-type: none"> – technical transfer – education/training – management of common property resource – empowerment 8.5 Roles of group leaders, members, JT/JTA 8.6 Group characteristics <ul style="list-style-type: none"> – size – caste/ethnic uniformity or mix – group information – group dynamics 8.7 Group development process	Lesson, discussion, visits, visiting speakers, case studies
9. Explain present government policies and programs for agricultural development of Nepal	9.1 List of Policies, DOAD, DOH, DLS, DOF, DOSC, DOI, ADS, NAPA, CAPA, LAPA 9.2 Merits and drawbacks in policies and implementation. 9.3 Ways to improve them	Lesson, visiting speaker
10. Help farmers to form and	10.1 Identify need	Field exercise, role

Skills/Task List	Contents	Teaching Strategies
run a group	10.2 Identify potential members 10.3 Help to organize group 10.4 Help group to choose its leaders 10.5 Help group to formulate its policies, plans etc. 10.6 As necessary, deal with problems of conflict within the group 10.7 Organize delivery of requirements to group as necessary, e.g. training, loans, inputs 10.8 As necessary, help group in other activities such as formation of welfare fund, drug/input shop 10.9 Monitor and evaluate the success (or failure) of the group	play (suggestion: If it proves impossible for trainees to be involved with real farmers' group formation, trainees could be involved in a role play extending over several weeks which explores the issues involved. Interaction with real farmers is preferable.)
11. Organize, facilitate and participate effectively in discussion	11.1 Organize a group of people to discuss a topic, question or issue 11.2 Act as leader, recorder, participant	Classroom, field exercise
12. Use appropriate responses in various situations	12.1 Situations-e.g. JT/farmer 12.2 Responses-e.g. use of authority, status, aggression, appeasement, reasoning, emotional pressure 12.3 Use appropriate language	Role play, during extension work
13. Give own definition of agricultural (including livestock/horticulture) extension	13.1 What do you think should be the definition of "agricultural extension"?	Discussion
14. State own opinion as to what should be the aims of agricultural extension in Nepal	14.1 Technical transfer-diffusion, trickle-down 14.2 Education 14.3 Empowerment 14.4 People's participation 14.5 Top-down v, bottom-up 14.6 What can Nepal afford?	Discussion
15. State own opinion as to who should be the target population	15.1 Defining the target population 15.2 Those living near the sub-center v. those far away 15.3 Those who come and ask v. those who don't 15.4 Resource-richer v. resource-poorer 15.5 The very poor 15.6 Women farmers 15.7 How can the target population (s) be reached?	Discussion
16. Explain fundamental concepts in extension	16.1 Innovation and its sources-the farmer, research	Lesson

Skills/Task List	Contents	Teaching Strategies
	16.2 Diffusion 16.3 Adoption	
17. Describe and compare the different extension approaches being used in Nepal and suggest the best method for given situation	17.1 General (traditional) extension approach 17.2 Training and Visits 17.3 Integrated rural development 17.4 Farming systems research and extension 17.5 Commodity user group approach 17.6 Small farmer development program 17.7 Farmer's Field School Approach 17.8 PPP approach.	Lesson, discussion, case studies
18. Suggest what motivates various groups in the extension process	18.1 What is "motivation"? 18.2 Maslow's hierarchy of needs 18.3 What is likely to motivate: – The farmer? – The JT/JTA? 18.4 How can we use this knowledge to make extension more effective?	Lesson, discussion, case studies
19. Explain the role of the extension worker(JT)	19.1 Change agent/catalyst 19.2 Educator/teacher 19.3 Facilitator 19.4 Organizer 19.5 Advisor/consultant 19.6 Researcher 19.7 Role in farmers' decision making process 19.8 Friend 19.9 etc.	Discussion
20. Explain how the JT can ensure farmers' participation in the various stages of initiating, planning and carrying out an extension activity	20.1 What is meant by "Farmer' participation" 20.2 Method and stages	Discussion, lesson, case studies
21. Carry through an extension campaign from identification of problem with farmers to evaluation of the activity (see: "Planning and Office Management Budgeting")	21.1 What is a campaign? 21.2 What are the stages in campaign? 21.3 Identify the problem to be tackled 21.4 Plan, carry out and evaluate the campaign.	Lesson, discussion, field exercise
22. Monitor and evaluate an extension program	22.1 What are "monitoring" and "evaluation"? Why are they necessary? 22.2 Carry out monitoring	It is suggested that JT trainees monitor and evaluate an

Skills/Task List	Contents	Teaching Strategies
	22.3 Carry out evaluation 22.4 Involve the farmer in monitoring and evaluation	extension activity of the TSLC trainees.
23. Record and report on extension activities	23.1 Maintain a daily diary 23.2 Complete reports as necessary for appropriate line agencies	Field exercise, classroom exercise
24. Explain the basic principles of training adults	24.1 Formal, non-formal and informal training 24.2 Characteristics of the adult learner 24.3 Profile of the learner 24.4 The learning contract 24.5 Facilitative approach	Field exercise, classroom exercise
25. Use training methods appropriate to training situation	25.1 Compare methods 25.2 Lesson 25.3 Teaching a skill 25.4 Role play 25.5 Group discussion 25.6 Case study	Lessons, demonstrations, role plays, field exercise
26. Prepare and use audiovisual aids appropriate to the training situation	26.1 Compare various aids 26.2 Real materials 26.3 Chalkboard, whiteboard 26.4 Posters, charts, flipcharts 26.5 Models, simulations 26.6 Slides, filmstrips, video, films (as available) 26.7 handouts 26.8 Test own-made media before use	Lessons, classroom exercises, field exercises
27. Plan a short course for farmers(or junior staff)	27.1 Assess the training needs of a group of farmers (or junior staff) 27.2 Learn training cycle. 27.3 Design a short course to meet their needs 27.4 Write aims and objectives 27.5 Select training methods	Field and classroom exercise
28. Train a group of farmers using course designed in 27	28.1 Decide who, when, where 28.2 Invite farmers 28.3 Arrange seating, etc. at training venue 28.4 Carry out training 28.5 Evaluate training 28.6 Follow-up training with farmers	Field exercise
29. Explain the importance of common property resources in rural Nepal and how they are managed	29.1 Discuss with reference to:- forests – pastures/common grazing – irrigation water – drinking water	Lesson, discussion, visits, visiting speakers, case study

Skills/Task List	Contents	Teaching Strategies
at present	<ul style="list-style-type: none"> – Community or group ownership of nursery, breeding animal, etc. 29.2 Traditional management <ul style="list-style-type: none"> – advantages and disadvantages 29.3 Recent changes and developments including the user group approach 	
30. State own opinion on the effect of various social factors on the success of extension can help them	<ul style="list-style-type: none"> 30.1 Norms, values and beliefs 30.2 Caste, ethnic group 30.3 Religion 30.4 Wealth-how is it measured? 30.5 Age 30.6 Gender 	Discussion
31. Explain the role of women in agricultural development and how extension can help them	<ul style="list-style-type: none"> 31.1 Gender roles in agriculture (which kinds of work do women do?) 31.2 Women's contribution to agriculture 31.3 Women's roles in household/farm decision making and control of agricultural resources 31.4 Differences due to <ul style="list-style-type: none"> – caste/ethnic group – area of Nepal – socio-economic status 31.5 Involving women in general extension <ul style="list-style-type: none"> – group – research outreach 	Lesson, discussion, guest speakers (suggestion: use the knowledge of trainees from different castes/ethnic groups and different parts of Nepal to explore these issues)
32. Work with women farmers in an extension activity	<ul style="list-style-type: none"> 32.1 Learn concept of GESI and its applications 32.2 Take active steps to involve women farmers in the various extension activities carried out by trainees 	Field exercise
33. Work with rural youth in an extension activity See 36.3 Practical work with rural youth and others on poverty alleviation	<ul style="list-style-type: none"> 33.1 Either take active steps to involve rural youth in the various extension activities carried out by trainees 33.2 Organize an activity aimed specifically at rural youth 	Field exercise
34. Explain the role of local of local leaders in agricultural extension	<ul style="list-style-type: none"> 34.1 Different types of leaders <ul style="list-style-type: none"> – traditional – formal and informal – professional/expert 	Lesson, discussion

Skills/Task List	Contents	Teaching Strategies
	<ul style="list-style-type: none"> – political their roles and effects 34.2 Involving local leaders in <ul style="list-style-type: none"> – general extension – groups – planning 	
35. Describe the incidence of rural poverty in Nepal	<ul style="list-style-type: none"> 35.1 Definitions of poverty 35.2 Where rural poverty is found in Nepal 35.3 Mountains, hills, terai 35.4 West v. East 	Lesson, discussion
36. Describe major causes of poverty in Nepal rural communities	<ul style="list-style-type: none"> 36.1 Farm size, availability of resources 36.2 Population growth 36.3 Nutrition, health 36.4 Education 36.5 Availability of inputs 36.6 Lack of irrigation 36.7 Lack of marketing 36.8 Lack of improved technologies related to specific areas, e.g. hills 36.9 Poor performance of extension and communication system 36.10 Lack of coordination between line agencies 	Lesson, discussion
37. Describe major effects of rural poverty in Nepal	<ul style="list-style-type: none"> 37.1 Migration 37.2 Low income 37.3 Need to supplement farm income with other work 37.4 Poor nutrition 37.5 Poor health 37.6 Lack of taxable activities to fund national programs 	Lesson, discussion
38. Describe how extension workers can improve nutritional status of people	<ul style="list-style-type: none"> 38.1 Describe the role of extension workers in improving nutritional status of rural people 38.2 Nutritional content of food 38.3 Malnutrition problems 38.4 Extent of malnutrition problems in Nepal. 38.5 Extension programs for nutrition 38.6 Nutrition requirements 	Lesson, discussion
39. Identify problems	<ul style="list-style-type: none"> 39.1 Describe Problem 39.2 Identification techniques 39.3 Describe Problem census 39.4 Describe Problem Solving (PS) techniques 	Lesson, discussion

Skills/Task List	Contents	Teaching Strategies
40. Explain the roles of ICT in agricultural Development	Concept of ICT. Importance and Applications. Digital media-Computer, Internet, Email, Mobile applications.	

Planning and Office Management

Credit hours: 4 / week
Total Hours: 176
Theory: 31 hours
Practical: 125 hours

Full Marks: 100
Theory Marks: 20
Practical Marks: 80

Course Description

This course provides skills and knowledge related to Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) in relation to community development and agricultural extension activities as approaches of extension used in different time. This covers planning, analyzing, identifying problems, need assessment and other activities in RRA and PRA including implementation. This subject is also design as a foundation course which gives reading, writing, and speaking skills as a leader appropriate for JTs to make them an effective occupational administrator. The emphasis will be given on the correct usage of the related technical terminologies while writing, speaking, and understanding simple technical publications.

Course Objectives

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

- Gather information, data, and problems
- Conduct need assessment of farmers
- Compare different methods like PRA, RRA, formal survey, etc.
- Assist to form farmers group and communicate effectively.
- Assist for evaluation, follow-up and monitoring of farmers program
- Manage time and handle official administrative as well as financial works.
- Collect and process farmers' orders.
- Conduct meetings and coordinate with other agencies.
- Prepare annual plan, programs and budget.
- Familiar with procurement rules and related constitutional agencies of Nepal.
- Deal with senior, junior and other related line agencies.

Skill/Task List	Contents	Teaching Strategies
1. Explain the reasons for planning and the different types of plan	1.1 Reasons for planning 1.2 Types of plan 1.3 Short-term v. long-term planning 1.4 District, village, farm	Lesson, discussion
2. Describe the planning cycle	2.1 Planning cycle	Lesson
3. Analyze the SWOT	3.1 Concept of SWOT 3.2 Concept of external and internal factors 3.3 Concept of negative and positive factors	Lesson, discussion
4. Explain how to gather	4.1 Sources of information and date	Lesson, discussion

Skill/Task List	Contents	Teaching Strategies
information, date, problems	4.2 Compare different methods – RRA, Formal survey, etc.	
5. Gather information by careful routine observation and recording	5.1 Report routinely on what has been observed, eg. on school farm or during outreach visit 5.2 Carry out a transect study of a ward or other local area	Classroom exercise, games, field exercise
6. Gather information from farmers using Rapid/participatory Rural Appraisal	6.1 Basic principles of RRA/PRA 6.2 Choose type of RRA/PRA according to need/objective 6.3 Interviewing technique – with individuals – with groups 6.4 Use different types of RRA/PRA – Resource mapping – matrix ranking – wealth ranking 6.5 Analyze results and draw conclusions 6.6 Identify problems and place in order of priority	Lesson, discussion, role play, field exercise
7. Gather information using a questionnaire	7.1 Use and complete a questionnaire 7.2 Identify problems and place in order of priority 7.3 Summarize results and draw conclusions	Field exercise
8. Draw up a village or ilaka profile	8.1 Cooperate with other agencies/departments as necessary	Field exercise or case study
9. Prepare a plan based on information collected	9.1 Identify alternative solutions/actions using techniques such as – small group discussion – brainstorming – asking experts 9.2 Predict likely outcomes of suggested solutions 9.3 Evaluate or climate solutions in a systematic way 9.4 Discuss criteria for choosing between alternatives e.g. circumstances, available resources 9.5 Prepare a plan based on chosen solution/action 9.6 Write aims and objectives	Classroom exercise, field exercise
10. Implement a plan	10.1 Monitor and adapt plan to circumstances as necessary	Field exercise

Skill/Task List	Contents	Teaching Strategies
	10.2 Evaluate effectiveness of plan 10.3 Identify lessons to be learnt for the future	
Note: The above objective can be taught as part of the process of carrying out an extension exercise. (See "Agricultural Extension, Communication and Rural Development" objective 21)		
11. Identify problems and constraints on an individual farm (see also small enterprise Development)	11.1 Discuss with farm family, including farm calendar 11.2 Carry out quick farm inventory 11.3 Identify possible underlying problems and constraints 11.4 Suggest possible solutions	Field exercise
Note: Whether Livestock, Plant Science JTAs are involved, it is necessary that this exercise looks at all aspects of the farm, not just those of the specialization. If the problems or constraints identified fall within a different specialization from that of the trainee, then she/he should refer it to the appropriate office. See also, " Livestock Production and Management ".		
12. Prepare different types of plan (See also Small Enterprise Development)	12.1 Individual farm plan 12.2 Agree on Plant science /Livestock component of village or ilaka plan 12.3 Extension plan 12.4 Personal work plan	Classroom exercise
13 Manage own time and set priorities among different duties	14 Make effective use of time available 14.1 Make personal work programs-daily, weekly, etc. 14.2 Set priorities amongst competing demands and duties	Classroom exercise, games
15 Understand and follow departmental rules, concerning general and financial administration and accounting	15.1 Structural, roles and responsibilities of MOA Department, Directorate and all units 15.2 General and financial administration and accounting rules and regulations of department	Classroom exercise
16 Handle and file official correspondence	16.1 Read official correspondence and take necessary action or response 16.2 File in-coming and copies of outgoing correspondence systematically	Classroom exercise, role play
17 Maintain necessary official records	17.1 According to department, e.g. Livestock treatment register	Classroom exercise
18 Manage cash transactions	18.1 Receive and pay out small amounts of cash 18.2 Maintain correct records and accounts	Classroom exercise, role play

Skill/Task List	Contents	Teaching Strategies
	18.3 Complete and issue official bills 18.4 Fill and issue official receipts	
19 Manage stores, supplies and equipment	19.1 Make and maintain inventories of stores, supplies and equipment 19.2 Keep store records 19.3 Manage consumable on a "first in, first out" basis 19.4 Order replacements of consumable items on a timely basis 19.5 Store materials safely, cleanly and in an orderly fashion 19.6 Take proper precautions for storage of drugs, pesticides, fertilizers and other potentially dangerous materials 19.7 Store seeds correctly 19.8 Maintain proper cleanliness and security	Practical, role play, visits
20 Collect and process farmer's orders for inputs	20.1 Maintain necessary records 20.2 Pass on orders to correct agency 20.3 Follow-up in order to try for timely delivery	Classroom exercise, role play
21 Organize and conduct meetings	21.1 Sub-center staff meetings 21.2 Meetings with farmers 21.3 Formal and informal meetings 21.4 Make the agenda 21.5 Inform participants in good time 21.6 Chair a meeting 21.7 Take minutes and other records 21.8 Follow-up decisions of a meeting	Practical, role play (Suggestion: One period per week is scheduled as course meeting. Trainees can take turns to carry out the various steps and functions.)
22 Explain the role of other agencies which may operate at sub-center, ilaka or village level	22.1 DoA, HoH, DLS, DDC 22.2 Forestry range office 22.3 ADB, SFDP 22.4 AIC, Sajha, Cooperative 22.5 Irrigation dept. 22.6 Women's program 22.7 Village secretariat 22.8 Village development committee (or similar future body) 22.9 Others as suggested by trainees	Trainee presentations, visiting speakers, visits
23 Cooperate with other agencies in effective rural development activities/programs	23.1 Responding to farmers' needs 23.2 Working in/as a team	As necessary in other activities: some activities should be done by trainees in teams or groups
24 Draw up as annual work program at sub-center level	24.1 Relate to local plans and farmers' needs 24.2 Co-ordinate with other agencies as	Classroom exercise

Skill/Task List	Contents	Teaching Strategies
	necessary	
25 Prepare an annual budget for the sub-center level program	25.1 Collect necessary rates, costs and prices 25.2 Estimate quantities/amounts of materials and inputs required 25.3 Prepare budget	Field and classroom exercise
26 Explain the main management styles and state own preference for (a) Supervisor's style and (b) Own style	26.1 Different styles and their relation to motivation of staff 26.2 Choices	Lesson, discussion, role play
27 Agree job description with junior staff	27.1 Lines of authority 27.2 Responsibilities and duties 27.3 Write clear and simple job description	Lesson, discussion, role play field exercise
28 Assign work to juniors, giving spoken or written instructions	28.1 Clarity and precision 28.2 Check that instructions have been understood	Field exercise, role play (Suggestion: JT trainees can assign work to and supervise the work of TSLC trainees or school farm laborers, where available)
29 Supervise the work of subordinates	29.1 Ensure work is done correctly 29.2 Provide encouragement and motivation as necessary 29.3 Correct faults sympathetically and sensitively	Field exercise, role play
30 Maintain proper records of personnel	30.1 Attendance records 30.2 Leave and travel registers 30.3 Performance records	Field exercise, role play
31 Administer payment of laborers	31.1 Maintain necessary work records 31.2 Prepare payrolls, vouchers 31.3 Pay labor	Field exercise if possible, otherwise role play
32 Deal correctly with breach of discipline or unsatisfactory performance of a subordinate	32.1 Follow official procedures concerning warnings, etc. 32.2 Interview offender in calm and fair manner 32.3 Find out the facts of the matter as far as possible 32.4 Agree action with offender or take own action or decide to pass case to other authority	Role play
33 Explain the act and rules related to procurements	33.1 Formation of procurement committee 33.2 Estimation, Tender document preparation	Lesson, discussion, role play field exercise

Skill/Task List	Contents	Teaching Strategies
34 Follow the official decision process	34.1 Tipani, program estimate 34.2 Meeting for decision process	Lesson, discussion, role play field exercise
35 Explain the roles of Constitutional Agencies of Nepal (नेपालको सबिधानमा ब्यवस्था भएका सबैधानिक निकायको भुमिका)	35.1 CIBA (Akhatiyar Durupayog Anusanthan Aayog) and its unit in district level 35.2 Rastiya Satarkata Kendra and its unit in district level	Lesson, discussion, role play field exercise
36 Develop the skill on latest technologies	36.1 Computer handling, Microsoft office (XL, Word, Power point etc) 36.2 E mail, internet, photocopy, Fax handling and operating procedure	Lesson, discussion, role play Practical exercise

Farming Systems

Credit hours: 2/week
Total Hours: 78
Theory: 16 hours
Practical: 62 hours

Full Marks: 50
Theory Marks: 10
Practical Marks: 40

Course Description

This course provides the basic knowledge of farming system in the context of Nepal. The course includes the components and characteristics of farming system and their roles in agriculture. It includes the natural ecosystem, agriculture systems and its interaction. The course also provides the relationship between agriculture system and extension.

Course Objectives

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

- Define the farming system and its approaches.
- Explain the different components and characteristics of farming system for sustainable food security.
- Apply the knowledge of cropping system to maintain the soil fertility
- Suggest how a particular system (a farm or group of farms) could be managed to conserve and utilize community and farm resources to maximize overall productivity and efficiency.
- Explain the relationship between natural (wild) eco systems, agricultural systems and social systems.
- Describe the linkage between agricultural research, education, and extension, credit and input supply and local farming systems.

Skill/Task list	Contents	Teaching strategies
1. Explain how the Farming System Approach has developed in Nepal and its advantages over earlier approach	1.1 Definition of farming system 1.2 Earlier approaches - Disciplinary based - Cropping system based 1.3 Farming system is a multidisciplinary approach	Lesson, discussion
2. Explain the different components of farming system	2.1 Different components Farming system 2.2 Difference between farming system and cropping system 2.3 Farming system in different agro-climatic zones of Nepal	Lesson, discussion
3. Explain the basic characteristics of a farm	3.1 Characteristics of farm (farm and family, source of water, land type (irrigated, rain fed), soil structure and type, soil fertility status 3.2 Irrigation system, irrigation channel 3.3 Source of manure and fertilizers 3.4 Crop calendar 3.5 Relationship among various farm characteristics	Lesson, discussion

Skill/Task list	Contents	Teaching strategies
4. Explain the relationship between natural (wild) eco systems, agricultural systems and social systems	4.1 Interaction of Human with different components of farming system, farming components in Nepal and their linkage with each other.	Lesson, discussion
5. Farming system approach for sustainable food security	5.1 Farm enterprises (crops, livestock, poultry, horticulture, aquaculture, apiculture, mushroom) 5.2 Farm production based on market and consumer demand	Lesson, discussion
6. Describe the importance of natural ecosystems for present and future agriculture	6.1 Source of genetic/breeding material for crop improvement 6.2 Source of new crops 6.3 Source of predators and parasites of agricultural pests/diseases 6.4 Minimizing the “greenhouse effect” 6.5 Importance of national parks, lakes, reserves	
7. Explain the interaction among crops, horticulture livestock, forest, grazing land and the household	7.1 Cereals, pulses, oilseeds, fruit trees 7.2 Role of forest to maintain farming systems 7.3 Implications for the farmer	Lesson, field visits, discussion
8. Describe the various types of cropping systems	8.1 Cropping patterns - On khet (irrigated) and bari land (upland) - at different altitudes (Terai, Midhill, Highhill) 8.2 Mono cropping, Relay cropping, Mixed cropping, Multiple cropping, inter cropping and crop rotation 8.3 Cropping index and intensity (calculation of Cropping intensity) 8.4 Maintenance of soil fertility through different cropping system	Field exercise, visits, discussion, Case study
9. Livestock Farming Systems	9.1 livestock based farming systems (Goat farming, duck farming, piggery farming, fisheries) 9.2 Role of livestock in crop production 9.3 Fodder supply system 9.4 Importance of fodder trees and grasses for Livestock animals 9.5 Role of labor, gender in livestock raising 9.6 Livestock products marketing	
10. Describe the principles of agro-forestry and their possible roles in Nepalese agriculture	10.1 Agro forestry in different altitudes 10.2 Types of agro forestry 10.3 Traditional practices and improved practices for fodder trees production 10.4 Relationship between agro forestry and Livestock raising 10.5 Sources of organic matter for crop production and bedding materials	Lesson, visits, discussion

Skill/Task list	Contents	Teaching strategies
11. Suggest how a particular system (a farm or group of farms) could be managed to conserve and utilize community and farm resources to maximize overall productivity and efficiency	11.1 What can be done by individual farmer? 11.2 What would be better done by a group? 11.3 Most effective use of inside generated inputs?	Field exercise, discussion
12 Describe the linkage between agricultural research, education, and extension, credit and input supply and local farming systems	12.1 Nepal Agricultural Research Council (NARC) 12.2 Department of Agriculture (DoA) 12.3 Institute of Agriculture and animal Science (IAAS) 12.4 Agriculture and Forestry University (AFU) 12.5 Credit Institutions (Banks)	Classroom exercise, discussion
13 Explain the importance of farming system research and extension in Nepal.	13.1 Past research programs on farming system and their achievements 13.2 Present research programs on farming system and their aims	Lesson and visit if possible

Research Field Trials & Project Works

Credit hours: 3/week
Total Hours: 117
Theory: 23 hours
Practical: 94 hours

Full Marks: 75
Theory Marks: 15
Practical Marks: 60

Course Description

In this course the students will chose a project under the instruction of instructors in the institute. The nature of the project works/ trials depend on type of livestock species/ crops. They will select sites for various types of trail on school farm (on-station) or on farmers' fields (on farm). The course also provides the skills from proposal writing to presentation of data including management of whole trials.

Course Objectives

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

- Understand the importance and explain the role of agricultural research in increasing agricultural production and improving agricultural productivity in Nepal.
- Explain the basic principles of field trail techniques.
- Prepare proposal for individual project
- Design and conduct the simple trails.
- Manage whole trial and apply treatments to a field trail.
- Analyze and present the data and gather feedback from farmer regarding individual project or outreach trails.

Skill/Task List	Contents	Teaching Strategies
1. Understand the importance and explain the role of agricultural research in increasing agricultural production and improving agricultural productivity in Nepal. At the same time, they will be familiarized in cooperating the simple trails and designs	1.1 Agricultural Research: Concepts, Definition and Objectives 1.2 Farmers own knowledge and resources as a source of research. e.g. traditional varieties; traditional pest control 1.3 The link between research and extension 1.4 The organization in Agric research in Nepal 1.5 NARC, Private Sectors, Farmers, AFU, TU, NAST 1.6 Other research stations 1.7 Types of Agricultural Research: Basic Research (IET, CVT), Adaptive Research and Applied Research (PPVT, FFT, IRD, Farmers Field School)	Discussion, Lectures, Field Experiments , visits to research stations and outreach sites

	1.8 Research Tiers: Station Research, Off-station Research, Research Outreach	
2. Explain the basic principles of field trail techniques	2.1 Objectives of field trails 2.2 On-station v. on-farm 2.3 Methods of estimation of errors 2.4 1. Replication 2.5 Randomization 2.6 Local control 2.7 Common experimental designs e.g. Randomized Complete Block Design (RCBD) 2.8 Complete Randomized Block Design (CRD)	Lessons, classroom exercises, Field lay out, Visit to Research Farms/Centers
3. Select sites for various types of trail a. on school farm (on-station) b. Off-station or on farmers' field trials (on farm)	3.1 Characteristics of a good trial site a. soil/micro-climate b. slope/size c. previous use d. one or several terraces e. accessibility for supervision 3.2 selection of farmer and adjoining farming area 3.3 Irrigation canal, trees and other physical obstacles	Lesson: field exercises on station and on-farm
4. Prepare proposal for individual project (Lay out, and apply treatments to a field trail following a trail plan or protocol)	4.1 Reading/understanding plans/protocols 4.2 Adapting plan to site as necessary 4.3 Randomization of treatment 4.4 3-4-5 triangle method of laying out a right angle 4.5 Laying out plots/blocks 4.6 Setting up of the trials 4.7 Sowing/planting 4.8 Applying treatments 4.9 Labeling, tagging 4.10 Keeping necessary records 4.11 Data inputting in computer	Field exercise carried out by trainees (individual project), Data inputting, use the analysed data
5. Manage a field trail	5.1 Set varietal trials, fertilizer trial, plant protection trial, soil related trials 5.2 Closely observe and monitor 5.3 Apply inputs as necessary 5.4 Weed, irrigate, etc. as necessary 5.5 Recognize and record growth stages as necessary 5.6 Keep necessary records	Field exercise, individual project

	5.7 Report condition and problems to supervisor as necessary	
6. Harvest and record a field trail	6.1 Harvest trial, according to plan or protocol, eliminating border effects as necessary 6.2 Weight and record necessary yield components 6.3 Where necessary, dry produce and adjust results to standard moisture content 6.4 Compile, tabulate, summarize data as necessary	Classroom exercise, individual project
7. Make simple analysis and presentation of data	7.1 Calculate treatment means medians and standard deviation 7.2 Explain the difference between a significant and a non-significant result 7.3 Present results in various forms a. a table b. Diagram e.g. histogram, curve, bar chart, etc. 7.4 Prepare necessary reports	Classroom exercise, individual project
8. Gather feedback from farmer regarding individual project or outreach trails	8.1 Gather information from individual project, including his/her observations and opinions 8.2 Complete necessary forms or report 8.3 Submit report 8.4 Prepare paper	Field exercise, individual project

Agricultural Enterprise and Marketing

Credit hours: 2/week
Total Hours: 78
Theory: 16 hours
Practical: 62 hours

Full Marks: 50
Theory Marks: 10
Practical Marks: 40

Course Description

This course is designed to provide basic skills and knowledge of marketing in relation to agricultural enterprises. The course also provides simple techniques of market survey and financial analysis of enterprise. It includes the loan application procedures to develop the own enterprise. It also covers the simple market survey of local areas to decide the production scale of business and make the yearly production schedule.

Course Objectives

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

- Perform basic skills for simple market survey.
- Prepare scheme for small enterprises.
- Market the agricultural products.
- Keep record properly.
- Forecast/ predict risk before starting a business.

Skill/Task List	Contents	Teaching Strategies
1. Describe basic economic terminologies and types of marketing	1.1 Concepts and uses of economic enterprise, market, marketing, commercial, subsistence, agribusiness, contract farming, fixed cost, variable cost, production cost, marketing cost 1.2 Concept of HIA (high input agricultural system) and LIA (low input agricultural system) 1.3 Types of market (monopoly, perfect competition, monopolistic competition) 1.4 Scope and importance of small enterprise development	- Classroom - Discussion
2. Perform a simple market survey	2.1 Designing a simple market survey Data collection, analysis and reporting methods 2.2 Methods of reviewing secondary data, collecting relevant ones and analyzing 2.3 Reviewing study report done by others – Specific consideration of seasonal market fluctuations that are so common for many agriculture products – The advantages and disadvantages of "off-season" production of agriculture products	– Lesson, classroom exercise, field exercise

Skill/Task List	Contents	Teaching Strategies
3. Conduct market and financial analysis	3.1 Methods of financial analysis : Methods of calculating BCR, break-even point, and rate of profit IRR (internal rate of return)	Lesson, classroom exercise, field exercise
4. Decide upon a product based on market and financial analysis	4.1 Decision-making regarding a particular product, based on a market and financial analysis (including seasonal variations)	
5. Make a simple yearly production plan for chosen product based on market and financial analysis	5.1 Methods of preparing a yearly production plan for a product, including quantity, quality, timetables and budgets (expenses expected, income expected)	– Classroom exercise, homework
6. Keep simple farm records as applicable	6.1 Field/Plot records 6.2 Livestock breeding records 6.3 Nursery/orchard records 6.4 Record of home consumption 6.5 Livestock input and production records 6.6 Crop/hortic input and production records 6.7 Inventories 6.8 Weather records	If possible keep for all or a part of the school farm
7. Keep simple accounts	7.1 Single entry book-keeping	As foe 13
8. Make a budget for an informal project (e.g. as needed before applying for a loan)	8.1 Collect costs of inputs and likely prices of products 8.2 Draw up a budget 8.3 Evaluate project from an economic point of view	Classroom exercise
9. Compare two projects using gross margin analysis	9.1 Gross margin analysis	Classroom exercise
10. Prepare a cash flow chart based on production plan	10.1 Method of preparing a yearly production plan for a product, including quantity, quality, timetables and budgets (expenses expected, income expected)	Classroom exercise
11. Complete loan application forms based on production plan, budget, cash flow <ul style="list-style-type: none"> • Calculate simple interest • Explain the loan payment schedule • Explain rules of bank regarding payment of loans • Perform cash deposits and withdrawals at the local bank 	11.1 Procedure for obtaining loan from bank & other sources (ADB, rural Dev. Bank, financial cooperatives, etc.) <ul style="list-style-type: none"> ○ Calculation of simple interest ○ Loan payment schedules 	Classroom exercise, visit to bank

Skill/Task List	Contents	Teaching Strategies
<p>12. Complete simple farm/business inventory</p> <ul style="list-style-type: none"> • Maintain necessary records on regular basis (livestock, feed, seeds used, fertilizer, etc.) • Keep records of production* marketing costs • Keep records of income • Determine cost of production and profit/loss based on records 	<p>12.1 Review of inventory procedure 12.2 Keeping records of all expenditures and inflows including purchases and sales 12.3 Book keeping 12.4 Contents of fixed and variable cost 12.5 Methods of calculating fixed cost per crop 12.6 Methods of calculating variable cost per crop 12.7 Methods of calculating fixed, variable and total cost per hectare and per kg. 12.8 Calculating loss/profit, gross margin and net margins 12.9 Marketing cost, gross marketing and net marketing margins</p>	<p>Lesson, classroom exercise, homework</p>
<p>13. Design a marketing plan including target market, supply volumes and timetables, storage, packaging, transportation, and labor needed</p>	<p>13.1 Concept of target market 13.2 Designing a marketing plan, including target market, supply volumes, time and price, with marketing cost, storage, packaging, transportation, labor needed, taxes, and marketing strategies etc.</p>	<p>Classroom field exercise</p>
<p>14. Determine product prices</p>	<p>14.1 Estimation of the cost of production per unit and market price level 14.2 Simple interpretation of price determination under monopoly, perfect competition and monopolistic competition 14.3 Nepal government policy of agri. product pricing 14.4 Farm product price determination models : cost based, demand supply based, competition oriented and market segments or perception models</p>	<p>Classroom, exercise</p>
<p>15. Describe the marketing outlets or market places with importance and select appropriate ones</p>	<p>15.1 Farm product marketing outlets such as organized wholesale markets, supermarkets, cooperative markets, processing plants, periodic markets & retail markets 15.2 Characteristics of and benefit from each outlets 15.3 Outlet selection</p>	<p>Classroom, homework</p>
<p>16. Describe the procedures of salesmanship</p>	<p>16.1 Concept and need of salesmanship 16.2 Process and methods of salesmanship for marketing farm products</p>	<p>Classroom Exercise</p>

Skill/Task List	Contents	Teaching Strategies
17. Explain the benefits and methods of developing cooperative marketing	17.1 Concept and advantages of cooperative marketing 17.2 Methods of developing cooperative marketing	Classroom, homework
18. Design and deliver market information	18.1 Uses of product-market information 18.2 Collection, processing and dissemination technologies 18.3 Current market information systems in Nepal	Classroom Exercise, Field
19. Supervise workers/direct work on the farm or enterprise	19.1 Supervision of workers in private sector	Lesson, role play
20. Describe concept and process of agribusiness development	20.1 Concept of agribusiness and value chain 20.2 Processes of value additions on primary agri.-commodities 20.3 Agribusiness policy of Nepal 20.4 Value chain analysis, development Process and contract farming and advantages	Classroom homework
21. Explain the existing agricultural insurance policies of Nepal	21.1 Define agricultural insurance 21.2 Existing agricultural insurance policies 21.3 Advantages and disadvantages 21.4 Problems in implementation 21.5 Procedure of insurance	Classroom homework
22. Understand the concept of WTO	22.1 Objectives 22.2 Simple description of AOA 23.3 Simple description of SPS 24.4 Required preparations from farmers' side	Classroom, group discussions

Aquaculture

Credit hours: 3/week
Total Hours: 117
Theory: 23 hours
Practical: 94 hours

Full Marks: 75
Theory Marks: 15
Practical Marks: 60

Description

This course is designed to provide basic skills and knowledge on fish culture including species identification, its requirements, breeding, rearing and transportation of brood fish, fish seed and table fish. It gives basic skills on water quality and health management including the control of diseases, parasites as well as protection of cultivated fishes from enemies and predators. It also provides a basic concept of rearing Rainbow trout and other emerging fish species along with post-harvest management of fish.

Objectives

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

- Understand fish and Aquaculture.
- Describe the scope and importance of fish and fish culture in Nepal.
- Explain different species of fish cultivated in Nepal including their behavior.
- Select site, design and construct pond.
- Requirements of fish and fish farming.
- Transportation, rearing and stocking of fish seed.
- Practice on fish breeding.
- Identify disease and manage health.
- Describe and manage water quality.
- Learn harvest and post-harvest management.

SN	Skill / Task List	Related Technical Knowledge
1	Define and Understand fish , fisheries and aquaculture	1.1 Introduction to fish and fish culture 1.2 Zoological classification of fish 1.3 Differentiate between fisheries and aquaculture
2	Explain scope of fish farming in Nepal	2.1 History of fish farming in Nepal 2.2 Scope of fish culture in Nepal 2.3 Economic and other importance of fish and fish culture 2.4 Organizational structure of research, development and education 2.5 Current status, policies and programs
3	Explain method of fish culture	3.1 Methods of fish farming :based on water body, climate, rearing facility, water use, intensity, management ,fish farming zone of Nepal
4	Identify important body parts of fish	3.2 Collection and preservation of fish 3.3 Body parts (external and internal) and their functions
5	Identify common fish species found in Nepal	5.1 Indigenous species <ul style="list-style-type: none"> • Indian major carps: Rohu, Bhakur, Naini • Locally popular fish: Asala, Sahar, Katle, Buduna, Jalkapur • Weed/ predatory fish: Magur, Bhoti, Shinghi, Barari

SN	Skill / Task List	Related Technical Knowledge
		5.2 Exotic species <ul style="list-style-type: none"> • Chinese carps: Big head carp, Silver carp, Grass carp • Common carps: German carp, Israeli carp • Rainbow trout, Pangassius, Tilapia
6	Select site for fish farming	6.1 Conditions required for fish farming 6.2 Source of water/ water temperature, water budgeting 6.3 Drainage facility, soil type 6.4 Accessibility and security
7	Explain method of construction of fish pond	7.1 Farm/pond design, lay out plan 7.2 Dike, bernline, core wall and key trench, spill way, embankment and its slope, inlet, outlet, water surface area
8	Explain types of fish pond	8.1 Nursery pond 8.2 Rearing pond 8.3 Breeding pond
9	Maintain/repair/ preparation of fish pond	9.1 Different problems of fish pond, seepage control 9.2 Maintenance of dike height/slope 9.3 Cleaning of fish pond, application of fertilizer/lime in pond
10	Maintain water quality of pond	10.1 pH, turbidity, water temperature, dissolved oxygen level, ammonia, alkalinity, hardness, water level, pond fertility
11	Explain type of fish culture	11.1 Monoculture, Polyculture, Monosex culture, Integrated fish culture: Paddy cum fish culture, Duck cum fish culture, Pig cum fish culture etc 11.2 Stocking density in each type 11.3 Advantage and disadvantage of each type
12	Explain fish breeding	12.1 General concept of fish breeding and fingerling production, genetic approach to fish breeding 12.2 Conditions required for fish breeding 12.3 Natural and artificial breeding
13	Select brood fish	13.1 Characteristics of brood fish 13.2 Differentiation of male and female brood fish 13.3 Age of breeding for different species of cultivated fish
14	Explain natural breeding of common carp	14.1 Selection of brood fish, water temperature, season of breeding, male and female ratio, pond preparation, preparation of substrate, spawning, hatching, feeding of hatchlings, predator control, routine management
15	Explain artificial breeding of Indian major carps/Chinese carps	15.1 Selection of ripe brood fish, hatchery facilities, hypophysation technique, injection time/ dose of different hormones, spawning, fertilization, embryonic development, hatchling management, counting and transfer.
16	Transport fish seed	16.1 Ordering fingerlings; sources of fingerlings 16.2 Method transportation of fingerlings 16.3 Stocking density and method of stocking 16.4 Precaution to be taken during transport and stocking time, prerequisites before transportation
17	Rear fry/ fingerlings	17.1 Management of nursery pond; feeding of fry and fingerlings, socking densities, water quality and health management

SN	Skill / Task List	Related Technical Knowledge
		17.2 Protection from enemies; symptom of dissolve O2 deficiency 17.3 Assessment of growth rate, health check up
18	Rear fish for table purpose	18.1 Pond preparation, water management 18.2 Feeding of artificial feeds for fast growth 18.3 Natural food for fish,, Protection from enemies 18.4 Symptom of dissolve O2 deficiency 18.5 Assessment of growth rate
19	Rear brood fish	19.1 Procurement of brood stock, transportation of brood fish, food and feeding, routine management, 19.2 Protection from enemies, symptoms of maturity, brood handling
20	Understand Pangassius and Tilapia culture	20.1 General concept 20.2 Sources of fingerling 20.3 Rearing 20.4 Stocking density 20.5 Growth rate 20.6 Feeding habit 20.7 Artificial feeding 20.8 Routine management and marketing
21	Explain concept of rearing Rainbow trout fish	21.1 General concept 21.2 Site selection (requirement of running water, water quality, water temperature) 21.3 Stocking density, growth rate 21.4 Feeding habit and marketing 21.5 Water quality and health management
22	Explain concept of rearing fish in aquarium	22.1 General concept 22.2 Purpose 22.3 Type of fishes kept in aquarium 22.4 Sources of fingerling 22.5 Feeding habit and marketing 22.6 Aquarium maintenance.
23	Identify natural feed in pond	23.1 Feeding habits of different fishes 23.2 Natural food production 23.3 Types of natural food (phytoplankton, zooplankton and others) 23.4 Pond fertilization
24	Understand fish nutrition	24.1 Natural and artificial food 24.2 Nutritional requirements 24.3 Feeding the fish based on size, period and species 24.4 Mixing of different ingredients for fish ration 24.5 Feeding time, feeding behavior
25	Explain different weed and weed fishes	25.1 Aquatic weeds and their control 25.2 Weed fishes: Puntius spp. Glassogobius spp etc. 25.3 Control of weed fishes
26	Explain fish predators and methods to control	26.1 List of predatory fishes: Wallago attu, Clarius batrachus, Heteropneustes fossilis, Anguilla bengalensis, Ophiocephalus spp etc.

SN	Skill / Task List	Related Technical Knowledge
		26.2 Fish enemies: Insects,Snake, Frog, Crocodile, birds Otter and others 26.3 Control of predatory fishes and other enemies.
27	Common fish diseases and health management	27.1 Types of diseases 27.2 Common fish diseases: Trichodiniosis, White spot disease, Black spot disease, Tail and fin rot, Gill rot, Argulosis, Gyrodactylus, Dactylogyrus, EUS, seprolegniasis, coccidiosis, dropsy 27.3 Sign and symptoms, common drugs and chemicals, preventive and control and measures.
28	Harvest fish	28.1 Time and stages of harvesting 28.2 Methods of harvesting, types of nets, (Drag net, gill net, cast net, scoop net) 28.3 Care and maintenance fish nets 28.4 Fishing hooks and angling
29	Market fish	29.1 Process of Fish spoilage, maintenance of good quality 29.2 Marketing channel and fish market, pricing 29.3 Costumer behavior and marketing policy, recipes and processed products
30	Keep records	30.1 Record keeping (feed, production, costs, sales, health) 30.2 Analyzing record for management purposes
31	Develop and annual calendar for fish farming	31.1 Elements of a fish farming calendar 31.2 Operational calendar

Crop Production and Seed Technology

Credit hours: 6/week
Total Hours: 234 hours
Theory: 47 hours
Practical: 187 hours

Full Marks: 150
Theory Marks: 30
Practical Marks: 120

Course Description

This course is designed to practice the principles of crop husbandry as related to successful production of major field crops and seeds of Nepal. This course provides characteristics of good seed, seed certification system in Nepal, various practices in the field of seed multiplication. This course also emphasizes on skill about processing and harvesting without deteriorating quality of seeds. The practical aspect of the course should link with the Farming System and Small Enterprise Development courses.

Course Objectives

After completion of this course, the student will be able to:

- Explain principles of crop husbandry as related to successful production of major field crops and seeds.
- Perform the cultural practices required for successful production of major crop seeds grown in Nepal.
- Gain knowledge on the relationship between crop productivity and cultural practices.
- Describe the ecological requirements for crops grown in Nepal.
- Explain some fundamental principles of weed and their control.
- Describe the role of National Seed Board and concerning laws and policies in Nepal.
- Explain the principles of quality seed production and its importance.
- Identify the quality seeds by different methods.
- Multiply process and harvest the seeds.
- Store seeds as per maintaining its requirements.

Skill/Task List	Contents	Teaching Strategies
1. Explain the name, family and scientific name of crops	1.1 Definition of agronomy, cereals, pulses, oilseed, fiber crops, commercial crops 1.2 Family and scientific name of crops	Lesson, discussion
2. Classify the crops by season and pollination	2.1 Rainy, summer and winter season crops 2.2 Self pollinated and cross pollinated crops 2.3 Crop calendar of major crops	Lesson, discussion
3. Define the different cropping system	Definition of: 3.1 Cropping pattern 3.2 Cropping system 3.3 Relay cropping 3.4 Intercropping 3.5 Mixed cropping 3.6 Crop rotation	Lesson, discussion
4. Describe the critical stages of crop for irrigation and plant nutrients management	4.1 Define critical stages 4.2 Critical stages of: Rice, maize, wheat, barley, buckwheat, millet, chickpea, lentil, black gram, horse bean, mung bean, groundnut, soybean, sugarcane, sunflower, potato	Lesson, discussion, practical

5. Describe varieties released/ registered for crop production in Nepal.	5.1 Released and registered of different agronomical crop/ varieties in Nepal (terai, hill and mountain)	Lesson, discussion
6. Describe production packages of crops, major weeds & their control measures	6.1 Production packages: sowing/planting date, nursery raising, seed rate, spacing, intercultural operation, fertilizer recommendation, disease and pest management, harvesting, major weeds of rice, maize and wheat; their control measures 6.2 Critical stage of crops for weeding	Lesson, discussion and practical
7. Describe cropping system	7.1 Terai cropping system 7.2 Mid-hill cropping system 7.3 High hill cropping system 7.4 Rice and maize based cropping system 7.5 Symbols used for cropping system	Lesson, classroom exercise
8. Plant , harvest and store the agronomical crops	8.1 Appropriate planting and harvesting date of agronomical crops in terai, mid-hills and high hills crop maturity period 8.2 Appropriate moisture percentage for storage (rice, maize, wheat, legumes, oilseeds)	Lesson, discussion
9. Factor affecting crop production	9.1 Temperature, rainfall, humidity, solar radiation 9.2 Global warming, climate change and its effect on crop production	Lesson, discussion
10. Describe the role of the National Seed Board and the policies and laws concerning seeds in Nepal.	10.1 National seed board 10.2 Seed Act, 2045 10.3 Seed policy, 2056 10.4 Seed Regulation, 2069 10.5 National Seed Vision (2013-2025)	lesson
11. What is seed? Describe the characteristics of good seed	11.1 Definition of seed, difference between seed and grain 11.2 Importance of seed 11.3 Purity -Variety -Species 11.4 Viability 11.5 Germination 11.6 Moisture content 11.7 Cleanliness (weed seed, inert materials, other crop seed, other variety seed) 11.8 Pest and disease free on - outside of seed - inside of seed - Quarantine diseases	Discussion, lesson
12. Explain the importance of quality seed to the farmer	12.1 High yielding 12.2 Disease and pest free 12.3 Disease/insect resistant varieties 12.4 High viability 12.5 High vigour 12.6 Good germination 12.7 Climate resilient (drought, submerge) 12.8 Hybrid seeds and ifs characteristics	Role play, Practical, visit to the farmers
13. Describe the seed	13.1 Quality control (Field Standard and seed standard)	Lesson,

production and certification system in Nepal	<ul style="list-style-type: none"> - Seed certification system - a) Foundation seed, - c) certified seed, - d) Improved seed (Truthful label system) <p>13.2 Role of SQCC, RSTL in seed certification 13.3 Stakeholders in seed sector : farmers group, cooperatives, National seed company limited, Private seed companies, government farm/stations, NGO's, INGO's</p>	Discussion, Visits
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Note: If there is seed multiplication program operating near the school, try to get trainees involved in selecting and supervising contract farmers. If this is not possible, the only alternative may be to use part of the school farm and role play the farmer's part.

14. Selection of site and farmer for seed multiplication	<p>14.1 Farmer should understand and agree to contract for seed production 14.2 Farmer should have suitable site (disease and pest free, weed free, more organic matter in soil) 14.3 Irrigation facility 14.4 Isolation requirements 14.5 Variety, time, climate</p>	Field exercise, role play
15. Supervise the growing of a seed crop	15.1 Ensure cultural practices carried out correctly and on time(seed rate, method of sowing and other cultural operation)	Field exercise, role play
16. Inspect field perform rouging operation	<p>16.1 Identify off-types 16.2 Isolation 16.3 Look for seed borne diseases 16.4 Indentify the weeds 16.5 Rouging time (crop stages) 16.6 Reason for accept or reject for seed</p>	Field exercise, visit to seed lab
17. Harvest, dry and store a seed crop	<p>17.1 Ensure proper maturity for harvest 17.2 Maintain cleanliness 17.3 Drying and maintain standard moisture 17.4 Protect from disease, pest and weed (mechanical and chemical) 17.5 Store correctly - Necessary storage conditions 17.6 Keep properly labeled seed bag</p>	Lesson, Field exercise, Visit to the seed company
18. Take and dispatch seed samples	<p>18.1 Extracting a representative sample 18.2 Labeling 18.3 Packaging 18.4 Dispatching</p>	Practical
19. Test seed in the laboratory	<p>19.1 Moisture 19.2 Purity 19.3 Germination/viability 19.4 1000 seed weight</p>	Laboratory practical
20. Advise a farmer for on-farm seed storage	<p>20.1 Local methods 20.2 Improved methods 20.3 Seed stores for individual farms or groups of farms 20.4 Seed stores for selected crop</p>	Lesson, field exercise, role play

Soil Fertility Management

Credit hours: 4/week
Total Hours: 156
Theory: 31 hours
Practical: 125 hours

Full Marks: 100
Theory Marks: 20
Practical Marks: 80

Course Description

This course is designed to provide trainees to developed necessary skills and knowledge of soil properties and its management for agricultural practices. This course also provides basic knowledge of physical, chemical and biological properties of soil, sources, functions and deficiency symptoms of plant nutrients, organic matters and their properties, preparation of organic manures (FYM, compost and green manure) and bio- fertilizers.

Course Objectives

After completion of this course, the student will be able to:

- Describe the fertility status of Nepalese soil.
- Determine the physical, chemical and biological properties of soil.
- Identify the beneficial and non-beneficial microorganisms of soil.
- Explain the roles of nutrients and their deficiency symptoms.
- Prepare FYM, compost and vermin-compost.
- Determine soil pH and improve soil as per requirements.
- Gain knowledge and skills on soil erosion and its control.

Skill/Task List	Contents	Teaching Strategies
1. Describe soil fertility Status of Nepal	1.1. Know the various types of soil in Nepal 1.2 Understand soil fertility problem in Nepal 1.4 Understand Soil fertility mapping and its use	Discussion
2. Suggest ways of improving soil fertility in Nepal	2.1 Compositing <ul style="list-style-type: none"> – Better use of crop residues – Weeds/wild vegetation 2.2 Farmyard manure <ul style="list-style-type: none"> – Protecting quality – Bio-gas 2.3 Green manuring 2.4 Azolla 2.5 Use of legumes <ul style="list-style-type: none"> – In rotation – In mixed cropping 2.6 Mixing organic and chemical fertilizers 2.7 More efficient use of organic and inorganic manures <ul style="list-style-type: none"> – Placement – Incorporation – Timing 	Discussion, lesson

3. Explain the Properties of soil	3.1 Physical <ul style="list-style-type: none"> • Texture, structure, bulk density, particle density, soil pores and porosity, color, stickiness and plasticity 3.2 Chemical <ul style="list-style-type: none"> • Soil reaction, soil acidity and alkalinity • Causes of soil acidity and alkalinity • Management of soil acidity and alkalinity • Concept of soil fertility and liming • Soil pH and nutrient availability 3.3 Biological <ul style="list-style-type: none"> • Macro and microorganism present in the soil • Beneficial microorganism in the soil • Biological nitrogen fixation • Symbiotic and non-symbiotic nitrogen fixation • Role of mycorrhiza and PSB 	Discussion, lesson
4. Explain the essential plant nutrients and their role in plant growth and development	4.1 Role of various essential nutrients 4.2 Source of Plant nutrients 4.3 Deficiency symptoms of various plant nutrients and correction methods	Discussion, lesson
5. Identify and explain the Concept of various fertilizer	5.1 Chemical fertilizer 5.2 Organic fertilizer 5.3 Bio fertilizer 5.4 Bio organic fertilizer	Discussion, lesson
6. Explain the soil health and nutrient management	6.1 Concept of soil health 6.2 Source and types of organic matter in soil. 6.3 Soil organic matter and C:N Ratio 6.4 Concept and components of IPNS 6.5 Concept of organic farming 6.6 Sustainable soil management practice 6.7 SALT Technology	Discussion, lesson
7. Prepare bio-char	7.1 Definition of bio-char 7.1 Method of bio-char preparation 7.3 Using method of bio-char	Practical
8. Use cattle urine and explain cow shade improvement program	8.1 Methods 8.2 Use of urine	Practical
9. Make Vermicompost	9.1 Methods of vermi-composting 9.2 Importance of Vermi-compost 9.3 Plan layout of vermin pit 9.4 Use of Vermi wash and its important	Practical

10 Make good quality compost	10.1 Pit method 10.2 Heap method 10.3 Aeration, turning, etc.	Practical
11 Use Azolla	11.1 As green manure 11.2 Other uses	Practical
12 Inoculate legume seed with Rhizobium and Azotobacter	12.1 Nitrogen fixation 12.2 Rhizobium strains and legume species 12.3 Azotobacter and cereal seed 12.4 Sources of inoculums 12.5 Storage of inoculums 12.6 Inoculation methods 12.7 Sowing inoculated seed	Lesson, practical
13 Collect a representative soil sample from a field	13.1 Sampling technique 13.2 Labeling 13.3 Packaging 13.4 Dispatch to laboratory	Practical
14 Determine soil texture and moisture by finger feel test and make recommendations	14.1 Finger feel test for soil texture 14.2 Finger feel test for soil moisture 14.3 Make recommendation, e.g. choice of crop, need for irrigation	Lesson, Practical
15 Estimate soil pH using a kit box and make recommendations	15.1 pH scale 15.2 Procedure for estimation 15.3 Liming requirement, if practicable 15.4 Reclamation of soil by using lime or gypsum 15.5 Other recommendation, e.g. choice of crop	Practical
16 Estimate N, P and K content	16.1 Importance of N, P and K 16.2 Procedure for estimation 16.3 Recommendations-organic or inorganic manures	Practical
17 Calculate inorganic fertilizer applications based on NPK content and recommended rates	17.1 Commonly used inorganic fertilizers and their nutrient contents 17.2 For given area of land 17.3 For individual fruit tree 17.4 Based on soil testing result	Classroom exercise
18 Recommend agri. lime requirement for soil	18.1 Lime requirement based in soil condition	Classroom exercise

Horticulture Production and Nursery Management

Credit hours: 6/week
Total Hours: 234 hours
Theory: 47 hours
Practical: 187 hours

Full Marks: 150
Theory Marks: 30
Practical Marks: 120

Course Description

This course provides various principles and practices in the field of vegetable and fruit production as well as nursery management. Post harvest and flower production techniques are provided by this course. This course also provides various principles and practices in the field of landscaping and practices for the flower cultivation and land beautification, indoor and outdoor gardening. The practical aspect of the course should link with the Plant protection, IPM and FFS.

Course Objectives

After completion of this course, the student will be able to:

- Describe the role of horticulture in the economic development.
- Explain the classification of fruits, vegetables and ornamental plants.
- Identify the suitable horticultural crops for grown in different agro- climatic regions.
- Establish nursery for horticultural plants.
- Propagate horticultural plants.
- Demonstrate the techniques of training & pruning of ornamental plants.
- Produce the major ornamental plants of the country.
- Plan the different styles of gardening.

Skill/Task List	Contents	Teaching Strategies
1. Describe the role of fruit development directorate and vegetable development directorate	1.1 National Special crops development program (Citrus, Potato, spices, tea and coffee section,) 1.2 Other horticultural development programs 1.3 Supplying fruit tree saplings and vegetable seed and seedlings 1.4 Horticultural research and outreach 1.5 Horticultural extension	Discussion
2. Describe the role of Horticulture Directorate	2.1 Vegetable Development Directorate and Fruit Development Directorate 2.2 Other horticultural development programs 2.3 Supplying fruit tree saplings and vegetable seed and seedlings, horticultural research and outreach 2.4 Horticultural extension	Lesson, visiting speaker, visits
3. Establish a vegetable nursery	3.1 Site selection 3.2 Water source 3.3 Lay-out	Practical

Skill/Task List	Contents	Teaching Strategies
4. Establish vegetable nursery for commercial purpose	4.1 Species, varieties, quantities required by local farmers 4.2 Sources of good quality seed of required species and varieties 4.3 Planning-planting dates, etc. 4.4 Sowing, labeling 4.5 Routine cultural practices 4.6 Informing farmers of availability 4.7 Managing distribution	Practical
5. Establish a fruit tree nursery for tropical, sub tropical and temperate fruits	5.1 Nursery registration and its process and importance 5.2 Collection of mother stocks from authorized sources and growing, labeling and establish of mother stock orchard 5.3 Site selection 5.4 Layout 5.5 Seedbed preparation for seedling and root stock 5.6 Types of Media and method of preparation (Vermiculite, coco pit, sphagnum) 5.7 Water management,	Practical
6. Manage Establish a fruit nursery to produce saplings for sale to farmers	6.1 Species, varieties, quantities required by local farmers 6.2 Sources of good quality planting material of required species and varieties 6.3 Planning-planting dates, etc. 6.4 Sowing, budding, grafting, as necessary 6.5 labeling tagging 6.6 Routine cultural practices 6.7 Informing farmers of availability 6.8 Managing distribution <ul style="list-style-type: none"> - Hardening - Preparation, packaging and transporting 	Practical
7. Prepare a hot bed and a cold frame for production of off-season vegetables seedlings,	7.1 Principles 7.2 Construction 7.3 Use	Lesson, practical
8. Explain the principles of orchard management	8.1 Site selection 8.2 Lay-out 8.3 Soil and climate 8.4 Planting (high density planting) 8.5 Irrigation 8.6 Fertilizer application 8.7 Training and pruning	Lesson, visits

Skill/Task List	Contents	Teaching Strategies
	8.8 Plant Protection 8.9 Harvesting	
9. Store and preserve fruit and vegetables	9.1 Locally appropriate stores 9.2 Storage methods 9.3 Local methods of processing 9.4 Local methods of preservation 9.5 New methods of processing (Making jams jelly, etc.)	Lesson, Practical
10. Grade fruits and vegetables for marketing	10.1 Principals of grading 10.2 Methods of grading 10.3 Methods of sorting 10.4 Method of cleaning	Lesson and Practical
11. Market fruits and vegetables (see also Small Business Enterprises)	11.1 Principles of pricing (including picking, packing, transportation) 11.2 Determination of market location	Lesson and Practical
12. Analyze records for profit/loss (see also Small Business Enterprises)	12.1 Basic principles of : cost, return, loss, profit, cost- benefit ratio 12.2 Preparation of business plan	Lesson and Practical
13. Establish a flower nursery	13.1 Site selection 13.2 Water management 13.3 layout 13.4 Availability of market 13.5 Selection of suitable flower according to local climate, interests and market	
14. Manage flower nursery and flower bed	14.1 Indoor plant, requirements and daily care 14.2 Outdoor plant, requirements and daily care 14.3 Collection and storage of flower seeds 14.4 Planting of flower seeds 14.5 flower nursery management – Pricking out of seedling – transport of seedlings – transplanting of seedlings	Lesson and practical
15. Advance structures for nursery raising	15.1 Different advanced structure for nursery raising(greenhouse, glass house, plastic house, thatch house, shed house and mist house) 15.2 Differentiate among advanced structure for nursery raising 15.3 Advantages and dis-advantages of advanced structure for nursery raising 15.4 Uses of different advanced structure for nursery raising for commercialization	Lesson and practical

Skill/Task List	Contents	Teaching Strategies
16. Prepare and maintain a lawn	16.1 Types of grasses available Mowing and watering of lawns	Lesson and Practical
17. Landscape a garden around a lawn	17.1 Basic principles of landscaping	Lesson and practical
18. Prepare and maintain bonsai plants	18.1 Importance of bonsai plants care and management of bonsai plants	Lesson and practical
19. Plant and maintain orchid plants	19.1 Importance of orchids 19.2 Collection methods 19.3 Propagation methods 19.4 Maintenance requirements	Lesson and practical
20. Establish home garden for nutritional security	20.1 Definition of home garden 20.2 Difference between home garden and kitchen garden 20.3 Major elements of home garden 20.4 Layout of home garden 20.5 Construction of home garden for nutrition security including roof garden	

Plant Protection

Credit hours: 4/week
Total Hours: 156
Theory: 31 hours
Practical: 125 hours

Full Marks: 100
Theory Marks: 20
Practical Marks: 80

Course Description

This course is designed for gathering skill and knowledge about insects, pest and diseases of plants. It deals introduction of different types of pests, nature of damage caused by pests, sign and symptoms, management and preventive methods followed by farmers and technicians. This course emphasizes on skill and knowledge about running Farmers Field School (FFS) through Integrated Pest Management (IPM) approach without disturbing the natural ecosystem and discusses the scope and basic concept of IPM from a practical point of view and also deals about preparation and use of organic pesticides for pest management.

Course Objectives

After completion of this course, the student will be able to:

- Describe the external anatomy of a typical insect.
- Collect the insect pests of major crops identify and preserve them.
- Explain the principles of pest control.
- Explain the hazards of chemical pesticides and the tolerance limit.
- Handle pesticides & pesticide equipment.
- Prepare and use organic pesticide.
- Identify the disease causing agents.
- State the concept of plant diseases & their importance to human.
- Identify the disease, insects and pest problems of major crops and apply control measures.
- Calculate pesticides.
- Calibrate and handle equipment used in plant protection.
- State concept of IPM and FFS.
- Apply IPM approach to carry out FFS.
- Explain the concept and important of Plant Quarantine.
- Able to assist the plant clinic and survey and surveillance.

Skill/Task List	Contents	Teaching Strategies
1. Classify Major groups of pest organisms which attack plants	1.1 Invertebrates-Insects, mites, slugs, snails parasitic nematodes 1.2 Vertebrates-rodents, birds and wild animal 1.3 Pathogens-fungi, water moulds, bacteria, viruses, phytoplasma	Lesson

2. Identify different types of pest/disease problems in field and horticultural crops	2.1 Abiotic- Physiological, weather, nutrition, mechanical, etc. 2.2 Biotic- Pathogens such as fungus, bacteria, viruses 2.3 Biotic- Parasites and pests such as insects, mites, birds, rodents, nematodes 2.4 Soil-born, seed-born, vector-transmitted, etc.	Classroom exercise (Note: This should be a revision exercise) and field observation
3. Explain the causes of pest and disease epidemics	3.1 Abiotic factors-drought, excess rain, temperature, weather, soil reaction, nutrient 3.2 Agronomic factors-crop density, susceptibility 3.3 Parasites and pathogens 3.4 Disease triangle/ tetrahedron analysis	Lesson
4. Explain the causes of pest and disease epidemics	For example: 4.1 Presence of pest 4.2 Symptoms 4.3 Take samples if necessary 4.4 Crop history: – time/year of sowing/planting – variety – manure/fertilizer used – irrigation – pesticides 4.5 Site data: – Soil type and moisture (use finger feel tests) – Aspect, altitude – Weather during crop life – Rainfall – Strong winds – Hail, frost – Previous use/cropping 4.6 Diagnose, or fever samples or report to specialist	Practical
5. Take, preserve and dispatch samples of pests and diseases of field and horticultural crops	5.1 Collection 5.2 Preservation 5.3 Recording and labeling 5.4 Packaging and dispatching	lesson and Practical
6. Describe, preparation and possible use, local methods of control	6.1 Those known to trainees(indigenous, botanical etc) e.g. Neem, soap solution, ash, pyrethrum etc. 6.2 Companion planning 6.3 Use in field problem and storage	Discussion, practical
7. Describe the concept, principles and component of Integrated Pest management	7.1 Concept of ETL and EIL 7.2 Concept of IPM	Lesson

	<p>7.3 Component of different pest management</p> <ul style="list-style-type: none"> - Biological - mechanical/physical - cultural - chemical - legal etc <p>7.4 Protecting natural control/NEs and their preservation</p>	
8. Describe the concept of Farmer Field School, principle and application procedure	<p>8.1 Concept and principle of FFS</p> <p>8.2 Agro Eco System Analysis and its important in IPM FFS</p> <p>8.3 FFS Implementation procedure</p> <p>8.4 Field study in FFS</p> <p>8.5 Learning system in FFS</p>	Lesson and field observation
9. Suggest a system of integrated pest management for a particular crop	<p>9.1 Combine various methods</p> <p>9.2 Use methods requiring outside inputs little as possible</p> <p>9.3 Suggest different pest management strategy according to pest and crop</p>	Classroom exercise, practical where possible
10. Assess whether the use of a pesticide is economically, socially and technically justified	<p>10.1 Extent of present damage</p> <p>10.2 Estimate whether pest population has reached EIL and ETL</p> <p>10.3 Stage of the crop</p> <p>10.4 Likely effect on yield of present crop and likely damage</p> <p>10.5 Cost of pesticide</p> <p>10.6 Value of the crop</p> <p>10.7 Likely danger from pesticide to farm family, local community, wildlife, environment, etc</p> <p>10.8 Alternatives to pesticides?</p> <p>10.9 Discuss effectiveness, economic, availability, Safe and practical</p>	Practical, classroom exercise
Note: It is assumed that most trainees will have used at least a knapsack sprayer in their work		
11. Handle and use pesticides and application equipment safely	<p>11.1 Read precautions on label</p> <p>11.2 Use of PPE</p> <p>11.3 Safety handling during mixing</p> <p>11.4 Safety handling during spraying/dusting</p> <ul style="list-style-type: none"> - to operator - to other people, animals - to crop, water sources - to bees <p>11.5 Safety during cleaning equipment</p> <p>11.6 Storage and Disposal of unused chemicals, containers</p> <p>11.7 Waiting period, MRL</p>	Classroom exercise, practical

12. Calculate and formulate various concentrations and doses of pesticides	12.1 From commercial product 12.2 From active ingredient 12.3 For a given area	Classroom exercise, practical
13. Select the correct types of sprayer and nozzle for a given situation	13.1 Types of sprayer 13.2 High/Low volume 13.3 Types of nozzle 13.4 Selection criteria	Practical
14. Calibrate a knapsack sprayer	14.1 Calibration methods	Practical
15. Maintain and repair commonly used plant protection equipment	15.1 Knapsack sprayer 15.2 Duster 15.3 Seed dressing drum 15.4 Parts and functions	Practical
16. Explain plant competition and how this affects the practice of weeding	16.1 Plant competition for area, light, water, nutrients, etc. 16.2 Effects of weed completion on crop yields 16.3 Timing and frequency of weeding 16.4 Method of cost effective weed management	Lesson, practical application
17. Explain the legislation system of pesticide management	17.1 Major point of Pesticide Act and regulation 17.2 Process of pesticide registration, 17.3 Process of pesticide banding 17.4 Role and responsibility of Pesticide Inspector 17.5 Overlook of register pesticide 17.6 Identification of commonly available pesticide	lesson
18. Explain about biological control method	18.1 Concept & important of biological control method 18.2 Different microbial pesticides 18.3 Natural enemies and their identification 18.4 Different botanical pesticide	lesson and practical
19. Explain the plant quarantine system of Nepal	19.1 Plant quarantine and its important 19.2 SPS system 19.3 Plant protection act and regulation 19.4 WTO and Plant quarantine	lesson
20. Explain the plant health management and able to conduct the plant clinic	20.1 Plant health and its management 20.2 Concept of Plant clinic and its management 20.3 Diagnosis system in Plant clinic 20.4 Recommendation system in plant clinic	Lesson and practical
21. Able to identify and explain management practice of economic important pest and disease of important crops of Nepal	21.1 Cereal crop 21.2 Vegetable crop 21.3 Fruits 21.4 Ornamental plant 21.5 Industrial crop 21.6 Store grain pest	lesson
22. Explain the concept, importance and use of survey and surveillance	22.1 Definition, concept, Types 22.2 Importance in plant protection 22.3 Use	lesson

