Secondary Level (Grade 9-10) Curriculum
(For Technical And Vocational Stream)

Plant science

2072

Government of Nepal
Ministry of Education
Curriculum Development Centre
Sanothimi, Bhaktapur

Content

Curriculum Structure

Class 9

S.No.	Subject	Weightage/ week	Full Mark
1	Nepali	5 period	100
2	English	5 period	100
3	Mathematics	5 period	100
4	Science	5 period	100
5	**Computer Applications**	5 period	100
6	Extension and Community	5 period	100
7	Principles of Agronomy	5 period	100
8	Principles and Practices of Fruit Crop	5 period	100
9	Plant Protection	5 period	100
10	Soil and Soil Fertility Management	5 period	100
	Total	50 period	1000

Class 10

S.No.	Subject	Weightage/ week	Full Mark
1	Nepali	5 period	100
2	English	5 period	100
3	Mathematics	5 period	100
4	Science	5 period	100
5	Farm Management and Marketing	5 period	100
6	Aquaculture and Fisheries	5 period	100
7	Vegetable and Medicinal Plant	5 period	100
8	Crop Production	5 period	100
9	Industrial Entomology and Mushroom	5 period	100
10	Floriculture and Nursery Management	5 period	100
	Total	50 period	1000

***(One Period =45 Minutes)**

Level Wise Competencies (Grade 9 & 10)

1. Develop a sense culture of information technology and an appreciation of the range and power of computer applications
2. Develop an awareness of how computers work and how they are used in the home, school, workplace and community.
3. Acquire general knowledge and skills of agriculture extension in Nepalese context.
4. Be awareness in the role of extension worker, social system/norms/values and gender concept.
5. Understand the importance of farmer organization and groups for the agricultural and community development.
6. Develop general knowledge of agriculture, agronomy, their principles, latest technology and practices of crop production.
7. Be awareness in the role of agronomy and realize the importance of agronomy to boost the crop production in Nepal.
8. Develop general knowledge of horticulture, its division especially pomology, its principles and practices of fruit crop production.
9. Understand the importance of fruits in our life as well as country a whole.
10. Acquire general knowledge of pest management of different crops.
11. Understand the importance of pest management on crop production.
12. Develop general knowledge of soil, soil fertility and soil conservation.
13. Develop sense technologies on farm management.
14. Develop the skill of production and marketing of agricultural commodity.
15. Develop knowledge on farm budgeting and planning.
16. Develop a sense technologies on fish culture and site selection for fish culture,
17. Develop skills on identification of fish disease and control method
18. Protect fish from predator and develop different feed for fish rearing.
19. Develop the concepts of the principles and practices of vegetable and medicinal plant production.
20. Understand the on principles and practices of vegetable and medicinal plant production in the actual field of work,
21. State concept of cereals, oil seeds, grain legumes, cash, industrial crops and their production technology
22. Familiarize with agronomical practices for producing cereals, oil seeds, grain legumes, cash and industrial crops
23. State concepts beekeeping, sericulture and mushroom cultivation.
24. Manage and be familiar with beekeeping, sericulture, mulberry cultivation and mushroom cultivation
25. State principles and practices of landscape, flower production, plant propagation and nursery management
26. Impart basic knowledge and skills on principles and practices of landscape, flower production, plant propagation

Computer Applications

Grade: 9 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

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1. Introduction

The Computer Applications curriculum aims to prepare technically inclined students to be technologically adept as effective citizens, and to function and contribute effectively in an increasingly technologically driven world.

The end goal is that students enjoy using computer-related technology as an integral part of their lives and as an important tool in helping them to meet their own personal needs and the needs of society.

2. Competencies

1. Develop a sense of information technology culture and an appreciation of the range and power of computer applications.
2. Develop an awareness of how computers work and how they are used in the home, school, workplace, and community.
3. Appreciate the role computers play in everyday life and the impact computers have on society and people
4. Use common software to accomplish tasks.

3. Learning Outcomes

At the end of Grade Nine, students will be able to:

1. Realize the development process and progress of computers to till date.
2. Familiarize themselves with different types of computers, different generations of computer and software: System software and Application software.
3. Work efficiently with application software mainly MS-WORD and MS-EXCEL.
4. Use internet, search their research material and handle mails efficiently.
5. Explain the basics of programming language.
6. Realize the importance of computer in daily life and operate in proper manner.

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction to Computer**	1.1. The concepts of computer. 1.2 The History of computers. 1.3. The Computer system characteristics 1.4. The Capabilities and limitation of computers. 1.5. The Types of computers On the basis of data: • Analog • Digital • Hybrid On the basis of size • Micro • Mini • Mainframe and • Super 1.6. The Generations of computers and their features: • First • Second • Third • Fourth and • Fifth generation 1.7. The Types of PC/Es and their characteristics. • Desktop • Laptop • Notebook • Palmtop • Workstations	7

2.	**Computer System**	2.1. The concept of Computer Organization 2.2. Familiar with all hardware parts with CPU of Computer and dismantle 2.3. The basic components of a computer system – Input, Output, Processor and Storage 2.4. The Memory – Primary and Secondary, Cache (L1, L2), Buffer, RAM, ROM, PROM, EPROM, EEPROM 2.5. The Storage Device – Storage fundamentals - Primary Vs Secondary data Various Storage Devices - Magnetic Tape, Magnetic Disks: Hard Disk and Floppy Disks (Winchester Disk), Optical Disks: CD, VCD, CD-R, CD-RW, DVD, DVD-RW, Blue Ray Disc. Others: Flash drives, SD/MMC Memory cards Physical structure of floppy & hard disk, drive naming conventions in PC. 2.6. The Input Device - Keyboard, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen. 2.7. The Characteristics of monitor-Digital, Analog, Size, Resolution, Refresh Rate, Interlaced/Non Interlaced, Dot Pitch, Video Standard-VGA, SVGA, XGA etc. Printers and types – Impact (Dot matrix printer), Non-impact (Laser printer) 2.8. The Computer Software 2.8.1 Necessity of computer software 2.8.2 Types of Software-System Software, Application software.	15
3	**Operating System**	3.1. Introduction of operating System 3.2. Type-Batch, Single, Multi programming, Multi processing, Multi tasking, Multi processing, Timesharing, Real time, 3.3. Disk Operating System (DOS)- Introduction to CUI and it's feature, Concept of File and Directory, Wildcards and Pathname, System Files: Config.sys, IO.sys, MSDOS.sys, autoexec.bat 3.4. Windows Operating System, Introduction to GUI and its feature Working with a Window Environment and Window Application Program 3.5. Open Sources Operating System, Introduction of Open Sources	8

		Operating System, Introduction to Linux, UNIX	
4	**Programming languages**	4.1. Machine, Assembly, High Level, 4GL – their merits and demerits 4.2. Compiler, Interpreter and Assembler 4.3. List of High Level Programming Languages 4.4. Difference between Program and Software 4.5. Program Control Structures - Sequence, Selection and Iteration. 4.6. Program Design Tools – Algorithm, Flowchart and Pseudo Code 4.7. Introduction to QBASIC 4.7.1 Elements of QBASIC 4.7.2 QBASIC Statements 4.7.2.1 Declaration Statements CONST, DIM, REM 4.7.2.2 Assignment Statements LET, READ, DATA 4.7.2.3 Input/output Statements INPUT, PRINT, LINE INPUT, INPUT$ 4.7.2.4 Control Statements GOTO IF…. THEN IF…. THEN…….. ELSE IF…. THEN…. ELSEIF……. ELSE SELECT…… CASE…… FOR….. NEXT	6

5	**Application of Software**	5.1. Conceptualize Word Processing, types and uses, Word Processor's Interface Enter and Edit Text Formatting, Text-Characters, Paragraphs and Documents, Work with Special features of Word Processing – Language tools, Tables, WordArt and Charts Add Graphics 5.2. Conceptualize Spreadsheet and Use Spreadsheet, Types of Spreadsheet, Spreadsheet's Interface, Enter Data in a Worksheet – Labels, Values, Dates and Formulas Edit and Format a Worksheet – Relative and Absolute Cell References, Formatting Values, Labels and Cells Add Charts Data Filter and sort data Work with Special features of spreadsheet – General Functions and Formulas 5.3. Present Program Basics, Present Program's Interface, Create a Presentation Format Slides, Special Features of Presentation Programs – Transition, Animation and Custom Animation Work with Tables, Graphics, Word ART, Graphs, Organization Charts and Multimedia Integrate Multiple Data Sources in a Presentation Present Slide Shows	19
6	**Computer Networks and Topologies**	6.1 Introduction of computer networks and topologies 6.2 Mode of Transmissions Flow-Simplex, Half Duplex, Full Duplex 6.3. Communications Channels-Twisted, Coaxial, Fiber Optic, Serial and Parallel Communication 6.4. Modem-Working and characteristics 6.6. Types of Network - LAN, WAN, MAN, Internet 6.7. Topologies of LAN-Ring, Bus, Star, Mesh and Tree topologies 6.8. Components of LAN-Media, NIC, NOS, Bridges, HUB, Routers, Repeater and Gateways 6.9. Use of Communication in daily life	7
7	**Internet and Electronic mail (Email)**	7.1. Introduction of Internet 7.2. Uses of Internet 7.3. Explain the concepts of Protocols: Transmission Control Protocol (TCP)/Internet Protocol (IP) Hypertext Transfer Protocol (HTTP) File Transfer Protocol (FTP) Terminal Network (Telnet) Simple Mail Transfer Protocol (SMTP) Post Office Protocol (POP) 7.4. The Web Web Server Web Browser Web Site Domain Name System (DNS)	6

		Uniform Resource Locator (URL) 7.5. Search Engine	
		Total	68

PRACTICAL

Unit	Scope	Content Area	Activities	Period
2	**Computer Systems**	2.1. Be familiar with all the hardware parts of a computer within the CPU as well as external hardware. 2.2. Assemble PC. 2.3. Disassemble PC. 2.4 Access and Change BIOS settings	➢ Introduce with computer hardware like motherboard, CPU, Input and devices ➢ Set and Change BIOS setting	**10**
3	**Operating System**	3.1. Execute Simple DOS Commands COPY, REN, DIR, TYPE, CD, MD, BACKUP 3.2. Familiar with Windows Operating System 3.3. Familiar with UNIX as well as Linux Operating system 3.4. Install a Computer System by giving connection and loading System Software and Application Software. 3.5. Install Windows XP operating System. 3.6. Install Linux operating system.	➢ Install Operating software like Windows XP. ➢ Execute simple Dos commands ➢ Install various application software like MS office and Utility software like antivirus.	**18**
4	**Programming languages**	4.1. Familiar with machine, assembly and high level languages.	➢ Draw Flow charts and introduce with Q basic ➢ Execute simple introductory programs in Q Basic	**10**
5	**Application Software**	5.1. Create your Bio-Data in MSWord giving Educational and Personal Details. 5.2. Create an Excel Worksheet entering marks in 6 subjects of 10 Students. Give ranks on the basis of Total marks and also generate graphs. 5.3. Create a Database in MS-Access for Storing Library Information. Ex Fields: Book name, author, book code, subject, rack no, price, volumes Enter Sample data of 15 books in to database. 5.4. Design a PowerPoint presentation with not less than 10 slides on any of your interesting topic. Ex: Literacy, Freedom Struggle, Siddhartha Engineering College, Evolution of Computers, Internet etc. 5.5. Perform a project work in MS-Word. 5.6. Perform a project work in MS-Excel. 5.7. Perform a project work in MS-Power Point. 5.8. Perform a project work in MS-Access.	➢ Work with Microsoft office package especially WORD, EXCEL and POWERPOINT. Familiarize students with different tools associated with each application. ➢ Prepare Bio Data by using MS word ➢ Make library management system using MS Excess ➢ Prepare power point slides about their school ➢ Prepare the Mark sheet in MS Excel ➢ Make the graphical representation (graph, pie	**40**

			chart and so on) in MS EXCEL ➢ Make tables and tabulate data in MS EXCEL	
6	**Data Communication and Networks**	6.1. Install and Configure Windows NT operating system in a PC. 6.2. Construct Network by connecting one or two computer with a Windows NT Server. 6.3. Install and Configure LINUX operating system in a PC. 6.4. Construct Network by connecting one or two computer with a LINUX Server. 6.5. Learn the various types of cabling : Straight Through Cable, Cross Cable and Rollover Cable	➢ Install Windows Operating system in PC ➢ Connect the PC to the internet through coaxial cable ➢ Setup internet connection using Windows NT server.	**14**
7	**Internet and Electronic mail (Email)**	7.1. Browse Internet using Search Engines like Google.com, Yahoo.com and ask.com for files, pictures, power point presentations etc. Downloading files, EBooks, E Content from Internet. 7.2. Register for new Email address with any free Email provider and send Email using Internet to your friends, parents, teachers etc. 7.3. Configure the network for an Internet server. 7.4. Add / Remove devices using Hardware Wizard. 7.5. Add and Manage User Profile, Set permission to the users both in Windows NT and LINUX.	➢ Create Gmail ,Yahoo or Hot mail account ➢ Compose, send and check mail between friends in the class ➢ Search information using different search Engines ➢ Download E books, PDF files related to computers using internet	**10**
	Total			**102**

5. Learning Facilitation Process:

This course is designed to give the basic knowledge about the concept of computer and its components. This course includes both practical and theoretical parts that help the students to increase their ideas, knowledge, skills about computer applications, software, and operating system and so on.

To achieve this, the teacher himself needs to work on different types of subject matter that are found either within the field of school or outside. For fulfilling the objective of the course, the students should especially focus on group discussions, field visit and researches.

To facilitate the learning process, the following methods are to be implemented.

- Disassemble PC and learn different hardware components of computer in computer lab.
- Different Lab works related to different application software like MS word, MS excel, power point and MS Access is provided to each student under direct supervision
- Project works and exercises are given as assignment.
- Group discussions and power point presentations are provided to develop to work in groups being technologically bounded.
- Notes of each unit are provided to students for future reference

Beside these, these activities can also be followed to enhance the learning process.

- Group Discussion
- Field Visit
- Demonstration
- Research
- Questionnaire
- Practical Works
- Audio/Visual Class
- Internet
- Project Works
- Problem Solving.

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject: Computer Applications

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 9 Time: 1 Hour and 15 Min. Full Marks : 40

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction to Computer	2	1		3
2	Computer System	2	1	1	4
3	Operating System	2	1	1	4
4	Programming languages	1	1	1	3
5	Application of Software	3	1	2	6
6	Computer Networks and	2	1	1	4

	Topologies				
7	**Internet and Electronic mail (Email)**	**1**	**1**		**2**
Total Questions		**13**	**7**	**6**	**26**
Questions to Attempt		**10**	**5**	**5**	**20**
Marks		**10**	**10**	**20**	**40**
Time		**18**	**18**	**39**	**75 min.**

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Extension and community Development

Grade: 9 Theory: 40 Full Marks (68 Period) Practical: 60 Full Marks (102 Period)

1. Introduction:

Simply Extension education is a process of educating needy people aiming the dissemination of the findings. It can be formal and informal. Agriculture extension is very important in our country. This curriculum aims to provide the basic knowledge and skills of agriculture extension to disseminate modern agricultural technology to the community. It also provides awareness to the student about social system, gender concept etc while applying agriculture extension for the community development.

Extension Education is a two way process. Means it disseminates the new technology to the needy people and return feedback to the extension worker which help to further improvement. In agriculture farmers are key persons of extension who live basically in rural area, less literate in our context. Therefore without using different tools and techniques of extension education there is merely impossible to disseminate the new technology of agriculture to the farmers.

2. Competencies

1. Acquire general knowledge and skills of agriculture extension in Nepalese context.
2. Apply agriculture extension for the agricultural promotion in the country.
3. Explain the role of extension worker, social system/norms/values and gender concept.
4. Describe the importance of farmer organization and groups for the agricultural and community development.

3. Learning Outcomes

At the end of Grade nine, students will be able to:

1. Explain the basic knowledge and skills of extension
2. Apply basic principles and practices of extension in community development
3. Describe the importance of social norms, value and social system with respect to extension
4. Explain importance of forming farmer organization such as farmer groups, cooperatives and Water Users Organization.

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction**	1.1. Introduction to education, formal and non-formal education and importance in our context. 1.2. Concept and definition of extension education. 1.3. Development of extension education in Nepal and its objective and importance since then. 1.4. Extension as a communication process.	4
2.	**Communication**	2.1. Concept of Teaching Learning and factors affecting teaching learning process focusing adult group 2.2. Steps of extension teaching learning process 2.3. Method of communication (extension education) Individual, Group and Mass communication 2.4. General concept of Model of communication: Psychological and sociological model	**7**
3	**Transfer of technology**	3.1. Meaning of diffusion 3.2. Classification of adopters and factors affecting adoption process. 3.3. Functional linkages between research, extension and education 3.4. Role of extension worker in transfer of technology	6
4	**Extension program planning, monitoring and evaluation**	4.1. Concept and importance of program planning 4.2. Program monitoring, evaluation and follow ups 4.3. Extension program planning process and decentralization of program. 4.4. Need of evaluation of program planning	5

5	**Sociological Concept**	5.1. Concept of sociology and rural sociology and their importance in development process. 5.2.Different Terminologies from the sociological point of view: • Family • Group • Community • Social structure • Social custom • Social values and norms • Social process • Culture and social belief • Institution	7
6	**Social mobilization and community development**	6.1. Concept and history of social mobilization in Nepal. 6.2. Objective social mobilization in extension. 6.4. Concept and importance of development, • Sustainable development • Rural and community development 6.5. Major issues and problem of rural and community development program in Nepal.	8
8	**Group formation and group dynamics**	8.1. Groups: 1.1 Concept, Principle and types of group. 1.2 Procedure of group formation and its role in extension. 1.3 Dynamics of group leader in group management 1.4 Group meeting for problem solving and decision making 1.5 Types of farmers' groups and its role in agriculture extension 1.6 Group as a conflict management 8.2. Cooperatives: and water user association 2.1 Concept and development of cooperative and water user association 2.2 Characteristics and principle guidelines of cooperative 2.3 Cooperative education and role of cooperative in rural development	9
9	**Leadership Development**	9.1. Meaning and types of leaders and leadership 9.2. Characteristics of good leader 9.3. Selection and development of local leader 9.4. Role of local leaders in extension education their effectiveness	7
10	**Gender and**	10.1. Concept of gender and gender balance	5

	Development	10.2. Role of gender in development 10.3. Concept of WID, WAD, GAD and gender analysis	
11	**Need Based Training Program**	11.1. Meaning and importance of need based training 11.2. Method of identification of training needs 11.3. Concept of participatory training and experiential learning 11.4. Importance of training in agricultural development	5
12	**Motivation**	12.1. Meaning of motivation and needs in agricultural extension 12.2. Factors affecting motivation 12.3. Techniques of motivation of community worker, social worker and development worker	5
		Total	**68**

PRACTICAL

S.N	Content Area	Period
1.	Identify and prioritize the farmers' problems	5
2	Collect information by using RRA method	2
	Apply PRA to solve the community problem	3
3	Practices on development of visual aids such as posters, charts, pamphlets, flash cards and graphs	8
4	Conduct method demonstrations	6
	Conduct result demonstrations	7
5	Visit DADO, DLSO and related stakeholders in the district to understand existing extension practices	14
6	Study of social values and norms in adoption process	7
7	Conduct impact study of rural and community development program in Nepal	9
8	Conduct case study of a farmer group formed by DADO and/or DLSO	9

9	Interview with successful farmers' group to find out leadership skills	7
10	In women farmer's group differentiate the changes before and after involving in production activity.	7
11	Conduct participatory training program	9
12	Apply new innovation of agriculture in laggard area	9
	Total	102

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology
- Written method

- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject: Extension and community Development

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 9 Times: 1 Hour and 15 Min. **Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	1			1
2	Communication	1	1		2
3	Transfer of technology	1		1	2
4	Extension program planning, monitoring and evaluation	2	1	1	4
5	Sociological Concept	1		1	2
6	Social mobilization and community development	1	1	1	3
7	Group formation and group dynamics	2	1	1	4
8	Leadership Development	1		1	1
9	Gender and Development	1	1		3
10	Need Based Training Program	1	1		2
11	Motivation	1	1		2

Total Question	**13**	**7**	**6**	**26**
Attempt Questions	**10**	**5**	**5**	**20**
Marks	**1x10=10**	**2x5=10**	**5x4=20**	**40**
Time	**18**	**18**	**39**	**75 min.**

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Principles of Agronomy

Grade: 9 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

1. Introduction:

This course provides the basic concepts of agronomy for successful crop production. The course introduces agriculture and agronomy, climatic factors influencing crop production, concept of tillage, water management, seed production technology, cropping system the course also discusses the practices of soil management as related to crop production.

2. Competencies

1. Explain the climate, tillage and plant nutrients affecting the growth and productivity of crops.
2. Identify the crops ready for harvesting and harvest with proper storage techniques.
3. Identity tools and equipments used in tillage and other agricultural operations.
4. Apply manure and fertilizer and water to the crops for successful crop production.
5. Enable to identify the major need of crop and apply the need management practices.
6. Demonstrate the knowledge for seed production of crops.
7. Explain the problems and characteristics of hill, rain and organic agriculture.

3. Learning Outcomes

At the end of Grade Nine, students will be able to:

1. Describe the concept of agronomy, principles, modern technology and practices of crop production
2. Apply the knowledge and practical experiences of crop production in actual field.
3. Realize importance and necessity of agronomy in our context.

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction to Agronomy**	1.1. Introduction to agriculture. 1.2. Definition of agronomy. 1.3. Importance of agronomy and its role in Nepalese context. 1.4. Agronomical classification of field crops. 1.5. Relation between agronomy & other crop science.	5
2.	**Climate**	2.1. Defination of climate & weather 2.2. Types of climate 2.3.Classification of different climatic zones & crops. 2.4. Effect of climate on crop production .	**7**
3	**Farm Mechanization**	3.1 .Definition & concept 3.2 .Advantage s & disadvantages . 3.3. Hand, Bullock, drawn & power operation equipment 3.4. seed dril /seed cum fertilizer dril machine 3.5. Harvester 3.6. Thresher & cleaner	11
4	**Soil management**	**4.1.Tillage** 4.1.1. Definition and importance of tillage 4.1.2. Types of tillage and advantages and limitation of different types of tillage 4.1.3. Tillage practice in our country	11
5	**Cropping system**	5.1. Definition of cropping system& cropping pattern 5.2. Mono cropping 5.3 Mixed & relay cropping 5.4. Inter & multiple cropping 5.5. Cropping scheme & crop rotation	6

		5.6. Cropping intensity 5.7.Cropping index & Harvesting Index	
6	**Water Management**	Two aspect of soil management would be considered in this topic: **6.1 Irrigation** 6.1.1. Introduction 6.1.2. Importance of water in crop life. 6.1.3. Types of irrigation system practiced in Nepal 6.1.4.Critical stages of moisture requirement in major agronomical crops **6.2. Drainage:** 6.2.1. Concept of drainage and drainage system 6.2.2. Objective and importance of drainage in crop production 6.2.3 . Adverse of effect poor drainage in crop production 6.2.4. Rain water harvest technique	10
7	**Seed and seed quality**	7.1. Meaning of seed and characteristics of quality seed. 7.2 Types of seed 7.3. Importance of quality seed in crop yield. 7.4. Quality seed production and method of seed certification. 7.5. General concept of seed/gene bank, patent right.	**6**
8	**Post Harvest Handling**	8.1. Concept of Post Harvest Handling 8.2. Importance of proper post harvest handling. 8.2. Method of proper post harvest handling for consumption purpose and seed purpose	**3**
		Total	**68**

PRACTICAL

Unit	Activities	Period
1	1.1. Identify plants and seeds of common agronomic crops.	6
2	2.1. List the different agronomical crops cultivated in different climatic zone	4
3	1.1. Identification and familiar with manure and fertilizers. 1.2. Preparation of compost. 1.3. Calculation of manure and fertilizer for different crops 1.4. Application of manure and fertilizer 1.5. Application of green manure in rice field	13
4	4.1. Identification of hand tools and implements used in tillage 4.2. Land and seed bed preparation. 4.3. Treat, sow seed and transplant of seedlings	13
5	5.1. Practice of rain fed, irrigated and mix cropping system.	11
6	6.1. Practice of surface irrigation 6.2. Practice of erosion control method	8
7	7.1. Identification of different tools like sprayer, duster etc. 7.2. Identification insects and diseases 7.2. Practice on the use of pesticides in agronomical crop.	10
8	8.1. Identification of weeds 8.2. Application of weedicides	6
9	9.1. Sampling test of seed germination 9.2. Identification of healthy and diseased seeds	8
10	10.1. Identification of crop maturity and ripening 10.2. Harvesting and storage techniques of different crops	8
11	11.1. Exposure visit to government and private farm to impart the knowledge of modern farming.	15
Total		102

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology
- Written method
- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject: Principles of Agronomy

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 9 Time: 1 Hour and 15 Min. Full Marks : 40

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction to Agronomy	2			1
2	Climate	2	1		3
3	Nutrition	2	1	1	4
4	Soil management	1	1	1	3
5	Cropping system	1			1
6	Water Management	1	1	1	3
7	Pest Management	1		1	2
8	Weed management	1	1		2
9	Seed and seed quality	1	1	1	4
10	Post Harvest Handling	1	1	1	3
Total Question		13	7	6	26
Attempt Questions		10	5	5	20
Marks		1x10=10	2x5=10	5x4=20	40
Time		18	18	39	75 min.

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Principles and Practices of Fruit Crop Production

Grade: 9 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

1. Introduction:

This course provides basic knowledge on importance, scope and types of fruit crops in Nepal. It is designed to develop necessary skills and knowledge of horticultural techniques required for general orchard management related to fruit production. Use of plant growth regulation and post harvest handling of fruits is to be provided by this course.

2. Competencies

1. Plan, organize and establish a new orchard.
2. Perform intercultural operation on fruit production
3. Demonstrate the techniques of training and pruning fruit trees.
4. Cultivate major fruits and demonstrate the post harvest practices of fruits.
5. Demonstrate the use of PGRS on fruit production.
6. Identify the horticultural tools and equipments.

3. Learning Outcomes

At the end of Grade Nine, students will be able to:

1. Describe the concept of horticulture and its division.
2. Apply the knowledge and practical experiences of fruit crop production in actual field.
3. Realize importance and necessity of horticultural crops in Nepalese context.
4. Classify different fruits grown in Nepal.

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction**	1.1. Meaning & definition of horticulture and its branches (pomology, olericulture, floriculture and post harvest technology) 1.2. Importance & scope of horticulture 1.3. Types of fruit crops (tropical, sub-tropical and temperate) found in Nepal.	6
2.	**Climate**	2.1 Environmental factors affecting fruit production • Temperature • Light • Rainfall and humidity • Wind • Snow • Hailstorm 2.2. Role of climate on fruit crop distribution in Nepal	7
3	**Home garden**	1.1 Definition of home garden, difference between home garden & kitchen garden. 1.2. Criteria of selection of fruit crop for home garden	**3**
4	**Orchard management**	3.1. Introduction of orchard. 3.2..Following factors should be considered while establishing a orchard 1. Climate and weather 2. Soil types and soil fertility 3. Irrigation facility 4. Soil water conservation 5. Inputs availability 6. Availability of labor 7. Transportation facility 8. Marketing and Storage facility	9
4	**Plant Growth and development**	4.2. Brief introduction to: • Germination • Dormancy • Juvenility • Maturity • Flowering • Fruiting • Ripening	8

5	**Plant growth Regulators**	**5.1. M**eaning and definition of plant growth regulators 5.2. Types of PGRs 5.3. Importance and commercial use of PGRs in fruit crops	5
6	**Cultivation of fruit crops**	6.1 Introduction to fruit crops 6.2 Classification of fruit crops 6.3. Cultivation of following fruit crops considering : Area of production, production volume, climate, soil, propagation, cultivars, training and pruning, cultural operation, pest management, fruiting, harvesting, post Harvest handling and marketing. 1. Tropical fruits: Mango, litchi, banana, papaya, 2. Sub-tropical fruit: Citrus (Mandarin orange, Sweet orange, Lime, Lemon), pomegranate, Kiwi, 3. Temperate fruit: Apple, pear, strawberry	25
7	**Harvesting and post harvest handling of fruits**	7.1. Maturity judgment of fruits 7.2. Harvesting and harvesting techniques 7.3. Post harvest handling techniques 7.4. Storage 7.5. Marketing	**5**
		Total	**68**

PRACTICAL

S.N	Activities	Period
1	**1.**Identify fruit/plantation crops 2. Identify horticultural tools/ equipment	10
3	1. Lay-out orchard / tea garden 2. Perform digging and filling of pits and planting of fruits 3. Perform Training and pruning of fruit and plantation crop	20
6	1. Fertilize/ manure fruit trees 2. Prepare Bordeaux mixture/ paste 4. Practice cutting/ layering/ grafting	21
7	1.study the equipment / tools used for preservation 2. Study ripening of banana 3. Perform dehydration and water loss of different fruits 4.Prepare jam/jelly/ketchup/juice/ squash/ pickles 5. Prepare green coffee.	51
	Total	102

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology
- Written method
- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject :Principle and Practices of Fruit Crop Production

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 9 **Time: 1 Hour and 15 Min.** **Full Marks : 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	1	1		2
2	Climate	2	1	1	4

3	Orchard management	2	1	1	4
4	Plant Growth and development	2	1	1	4
5	Plant growth regulators	2	1	1	4
6	Cultivation of fruit crops	2	1	1	4
7	Harvesting and post harvest handling of fruits	2	1	1	4
Total Question		13	7	6	26
Attempt Questions		10	5	5	20
Marks		1x10=10	2x5=10	5x4=20	40
Time		18	18	39	75 min.

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Plant Protection

Grade: 9 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

1. Introduction:

The course covers the brief introduction of insects, discusses and weeds and plant enemies which has significantly reduced the crop yield. The course also provides knowledge about plant pests management and protection appliances. Similarly the course also provides an explanation of pest and methods of pesticides application with their safe use.

2. Competencies

1. Practice on integrated approaches of pest management like; cultural, mechanical, biological, physical and chemical IPM techniques of pest management
2. Collect the insects, pests of major crops, identify and preserve them
3. Explain the hazards of chemical pesticides and tolerance limit
4. Identify the diseases, insects and pest problems of major crops and apply control measures.
5. Calibrate and handle equipments used in plant protection.

3. Learning Outcomes

At the end of Grade Nine, students will be able to:

6. Describe the concept of pest management of different crops grown in Nepal.
7. Apply the knowledge and practical experiences of pest management in actual field.

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction**	**1.1. Concept and definition of** 1.1.1. Biotic and abiotic factor 1.1.2. Pest 1.1.3. Insect 1.1.4. Disease 1.1.5. Pathogen 1.1.6. Micro-organism 1.1.7. Rodent 1.1.8. Nematode 1.1.9. Disorder 1.1.10. Pesticide 1.1.11. Weed 1.1.12. Entomology 1.1.13. Pathology	6
2.	**Plant Pests**	1.6. Insects: 2.1.1 Definition and characteristic features of insect 2.1.2. Insect life cycle and metamorphosis. 2.1.3. Classification of insects on the basis of different aspects: Like feeding habit, nature of damage etc 2.1.4. Natural enemies of insect 2,2, Disease: 2.2.1. Meaning of disease and its symptoms 2.2.2. Classification of disease: Infectious and non-infectious 2.2.3. Disease cycle 2.2.4. Introduction to plant pathogen: Fungi, Bacteria, Nematode, Virus etc. 2.2.5. Factors of disease development and plant disease epidemiology 2.3. Weed: 2.3.1. Definition of weed, types of weed 2.3.2. Effect of weed on crop production: competency on water, nutrient, sunlight, air etc 2.4. Others: 2.4.1. Rodents 2.4.2. others	**13**

3	**Pesticide**	3.1. Definition of pesticide 3.2. Types of pesticides: Insecticide, fungicide, nematicide, antibiotic, rodenticide and others 3.3. Formulation of pesticide 3.4. Pesticide calculation and compatibility 3.5. Method of pesticides application • Soil application • Foliar application • Fumigation • Seed treatment • Post-harvest treatment 3.6. Toxicity of pesticide after use 3.7. Harmful effect of pesticide: Poisoning and Pollution 3.8. Safe use and misuse of pesticide 3.9. Pesticide poisoning symptoms and first-aid measure 3.10. Pesticide rules and regulation in Nepal	**14**
4	**Plant Protection Appliances**	4.1. Introduction to plant protection appliances 4.2. Plant protection appliances commonly used in Nepal • Sprayer • Duster 4.3. Proper handling, care and maintenance of above tools	**6**
5	**Plant Pest Management**	Explanation and principles of plant pests management: 5.1. Physical Method 5.2. Mechanical Method 5.3. Cultural Method 5.4. Biological Method 5.5. Chemical Method 5.6. Regulatory Method 5.7. Genetic Method 5.8. Integrated Pest Management (IPM)	12
6	**Crop wise Pest Management**	6.1. Insects and mites management of major agronomical, horticultural and Industrial crops grown in Nepal 6.1.1. Standing crops • Identification of insect and mite • Life cycle • Nature of damage • Management 6.1.2. Stored crops (Post harvest) • Identification of post harvest insects • Life cycle • Nature of damage	17

		• Management 6.2. Disease management of major agronomical, horticultural and Industrial crops grown in Nepal 6.1.1. Standing crops • Symptoms diagnosis of different diseases • Major diseases cycle • Favorable condition of disease outbreak and nature of damage • Management 6.1.2. Stored crops (Post harvest) • Identification of post harvest diseases • Nature of damage • Management 6.3. Rodent control measure of field crops • General habit and characteristics of rodent • Nature of damage and rodent management techniques of standing crop and store.	
		Total	68

PRACTICAL

S.N	Activities	Period
1.	**1.1. General study of common insects and diseases**	**6**
2.	2.1. Identification of common insects and general features of insects 2.2. Life cycle of orthropoda and insects 2.3. Identify disease symptoms 2.4. Identify natural enemies of insects 2.5. Identify common harmful and beneficial insects	**24**
3	3.1. Identification of different pesticides found in Nepal 3.2. Calculation of pesticide 3.3. Formulation and dilution of pesticides 3.4. Preparation of bordeaux mixture	**12**
4	4.1. Identification of different plant protection appliances and study of their parts Sprayer and Duster	**6**

5	5.1. Collect and preserve different insects 5.2. Collect and preserve insect damage plant part 5.3. Collect and preserve diseased plant and plant part 5.4. Practice of different method of pesticide application 5.5. Practice of IPM in the field 5.6. Apply indigenous method of pest management	**30**
6	6.1. Study of proper pest management method/s of major agronomical crops 6.2. Study of proper pest management method/s of major vegetable crops 6.3. Study of proper pest management method/s of major fruit crops	24
	Total	102

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology

- Written method
- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject: Plant Protection

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 9 Time: 1 Hour and 15 Min. Full Marks : 40

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	2	1	1	4
2	Plant Pests	2	1	1	4
3	Pesticide	2	1	1	4
4	Plant Protection Appliances	2	2	1	
5	Plant Pest Management	2	1	1	4
6	Crop wise Pest Management	3	1	1	5
Total Question		13	7	6	26

Attempt Questions	**10**	**5**	**5**	**20**
Marks	**1x10=10**	**2x5=10**	**5x4=20**	**40**
Time	**18**	**18**	**39**	**75 min.**

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Soil and Soil Fertility Management

Grade: 9 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

1. Introduction:

This syllabus aims to provide knowledge and skills of soil and soil fertility management and also soil conservation techniques.

Soil is the primary factor of crop production because it gives support to stand and supply the necessary nutrients to the crops. Therefore it is very important to protect and preserve the soil and its fertility. This syllabus is designed to provide preliminary knowledge and skills of soil and soil fertility management. It also includes general knowledge of soil conservation techniques.

Soil is the basic necessity of crop production. Soil not only gives the support to the plant but also supplies different nutrients to the plats (crops). Therefore soil fertility management and soil conservation is most important for its sustainable and long term use.

2. Competencies

1. Acquire the general knowledge of physical and chemical properties of soil.
2. Understand function and deficiency symptoms of plants nutrients and their sources.
3. Acquire the knowledge and skills on soil erosion and its control
4. Prepare and protect farm yard manure, compost, making green manure and bio fertilizer.
5. Apply chemical fertilizer
6. Determine the soil PH and practice on soil improvement.

3. Learning Outcomes

At the end of Grade Nine, students will be able to:

1. Describe soil and soil property
2. Apply the knowledge and skills of soil fertility management.
3. Apply the knowledge and skills of soil conservation techniques.

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction**	1.1.Meaning definition & uses of soil 1.2. Component of soil 1.5.Importance of soil for plant growth	4
2.	**Geology in relation to soil**	2.1. Rock & minerals 2.2. Soil forming process	4
3.	**Soil Properties**	Properties of soil: **2.1. Physical properties of soil:** • Soil texture and structure • Bulk density, porosity and colour, • Importance of physical properties soil in crop production **2.2. Chemical properties of soil:** • Soil reaction: Soil PH, Acidity and alkalinity • Soil colloids: Organic and inorganic, Cation and anion exchange capacity • Importance of chemical properties soil in crop production **2.3.Biological properties of soil:** • Organic matters • Soil microorganisms • Importance of biological properties of soil in crop production	**21**
3	**Nutrition**	3.1. Introduction to nutrition and nutrient and their importance on crop production. 3.2. Essential nutrients and their categories according to plants need: • Primary • Secondary • Micro nutrient 3.3. Function and deficiency symptom of nutrient **3.4. Soil fertility evaluation:**	30

		• Visual analysis • Soil test • Plant tissue analysis • Biological method **3.5..Source of nutrients:** • Organic source • Inorganic source **3.6. Organic manure:** • Concept, scope and importance • Types and method of preparation • Major nutrient found in difference organic manure **3.7. Chemical fertilizers:** • Concept and importance • Types of chemical fertilizer 1. Nitrogenous 2. Phosphoric 3. Potassium 4. Micronutrient **3.8. Bio-fertilizer** 3.9. Integrated nutrient management: concept and importance	
4	**Soil conservation**	4.1. Introduction to soil conservation 4.2. Definition of soil erosion 4.3. Causes of soil erosion 4.4. Types of soil erosion (air & water) 4.5. Importance of soil conservation on soil fertility management 4.6. Practices soil conservation • Counter farming • Terracing • Run-off control • Cover crops or strip crop • conservation tillage	9
		Total	**68**

PRACTICAL

S.N	Activities	Period
1	1.2. Collect and prepare different soil samples 1.3. Identify different tools and chemicals used in soil analysis 1.4. Identify different soil forming rocks and minerals 1.5. Visit to surrounding area to identify soil profiles	**22**
2	2.2. Determine soil texture by feel method 2.3. Determine soil PH using PH meter & PH paper method 2.4. Determine lime requirement of acidic soil 2.5. Analyze soil using kit box	**20**
3	1.7. Identify different manures and fertilizers 1.8. Preparation of manures: FYM, compost. 1.9. Apply of manures in the field with respect to time and method 1.10. Calculation of chemical fertilizers 1.11. Apply of chemical fertilizer in the field with respect to time and method 1.12. Practice foliar application of micronutrient fertilizer 1.13. Identify nutrient deficiency symptoms in plant by visual method 1.14. Identify and collect nutrient deficiency symptoms of major crops	**40**
4	4.1.. Practice on soil conservation; • Run-off control • Cover crops • Field visit to see the counter plowing and terracing	**20**
Total		**102**

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology
- Written method
- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject :Soil and Soil Fertility Management

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 9 Time: 1 Hour and 15 Min. Full Marks : 40

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	3	1		4
2	Soil Properties	3	2	2	7
3	Nutrient	4	2	2	8
4	Soil Conservation	3	2	2	7
Total Question		13	7	6	26
Attempt Questions		10	5	5	20
Marks		1x10=10	2x5=10	5x4=20	40
Time		18	18	39	75 min.

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Class 10

Farm Management and Marketing

Grade: 10 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

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1. Introduction:

This course includes the basic skills and knowledge related to the principles and practices of farm management and marketing of agricultural commodities, the process of achieving the objectives of the business organization by bringing together human, physical, and financial resources in an optimum combination and making the best decision for the organization while taking into consideration and its operating environment.

To achieve objectives effective utilization and coordination of resources such as capital, plant, materials, and labor to achieve defined objectives with maximum efficiency is necessary. The management process through which goods and services move from concept to the customer. It includes the coordination of four elements called the 4 P's of marketing:

(1) Identification, selection and development of a product,

(2) Determination of price,

(3) Selection of a distribution channel to reach the customer's place, and

(4) Development and implementation of a promotional strategy.

2. Competencies

1. Explain/familiarize with different technologies of farm management.
2. Develop the skill of production and marketing of agricultural commodity.
3. Prepare farm budgeting and planning.
4. Identify farm resources.

3. Learning Outcomes

At the end of Grade Ten, students will be able to:

1. Explain principles and practices of farm management and marketing of agricultural commodities.
2. Manage farm and market of agriculture commodities.

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Basic economics**	1.1 Definition: Adam Smith, Marshall and Robinson 1.2 Subject matter and nature of economics 1.3 Basic concepts 1.3.1 Goods 1.3.2 Utility 1.3.3 Value and wealth 1.3.4 Equilibrium 1.3.5 Margin 1.3.6 cost 1.4 Price effect and income effect 1.5 Law of demand and law of supply 1.6 Law of diminishing marginal utility. 1.6.1 Meaning 2.6.1 Consumption 3.6.1 Limitation 1.7 Market structures 1.10.1 Market forms 1.10.2 Characteristics	11
2.	**Production factors**	2.1 Land 2.2 Labor	**5**

		2.3 Capital 2.4 Management	
3	**Introduction to farm management**	3.1 Definition, nature and scope 3.2 Objective of farm management **3.3** Importance and relationship with other Disciplines	6
4	**Farm Economics**	4.1 Farm Resources 4.2 Farm Power 4.3 Variable and Fixed Cost 4.4 Cost and Return Analysis	6
5	**Some common terminology used in Farm Management and Marketing**	5.1 Productivity/ Yield 5.2 Cost principle 5.3 Principle of substitution 5.4 Intensification and Diversification 5.5 Marketing Strategy and Linkage	7
6	**Farm planning**	6.1 Principles 6.2 Techniques	3
7	**Farm budgeting**	7.1 Partial and complete budgeting 7.2 Steps in farm planning and budgeting	**3**
8	**Farm record, account and farm inventory**	8.1 Introduction	**4**
9	**Concept of cooperative**	9.1 Definition 9.2 Organization/structures	**6**

		9.3 Roles 9.4 Cooperative marketing 9.5 Cooperative farming 9.6 Nepalese experiences	
10	**Agriculture marketing and management**	10.1 Meaning and concept 10.2 Nature of agricultural commodities 10.3 Classification of markets	**6**
11	**Marketing functions and Marketing channels**	11.1 Physical, exchange and facilitating functions 11.2 Marketing channels 11.3 Cost and selection of best channel for distribution of commodities	**6**
12	**Price variation: Spatial and temporal**	Introduction	**2**
13	**Conceptual meaning**	13.1 International trade 13.2 WTO and Nepal	**3**
		Total	**68**

PRACTICAL

S.N.	**Activities**	Period
1	Explore the five examples of price, wealth and value, utility and goods	8
2	Show equilibrium condition and margin	6
3	Calculate marginal utility (MU) and total utility (TU)	8
4	Present Graph of MU and TU	6

5	Estimate income elasticity	6
6	Calculate the cost curve	6
7	Derive demand and supply (including price determination curve)	7
8	Calculate cost (Variable, fixed, method of depreciation, cost of production)	7
9	Prepare income statement	8
10	Prepare net worth statement	6
11	Visit to farm area for farm record, survey, cost of production, analysis of available farm records, efficiency measure	10
12	Differentiate among different types of markets in Nepal	6
13	Prepare partial and complete budgeting	5
14	Prepare farm plan	13
	Total	102

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method

- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology
- Written method
- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject: Farm Management and Marketing

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 10 **Time: 1 Hour and 15 Min.** **Full Marks: 40**

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Basic economics	1		1	2
2	Production factors	1	1		2
3	Introduction to farm management	1	1	1	3

4	**Farm Economics**	**1**		**1**	**2**
5	**Some common terminology used in Farm Management and Marketing**	**1**	**1**		**2**
6	**Farm planning**	**1**	**1**		**2**
7	**Farm budgeting**	**1**		**1**	**2**
8	**Farm record, account and farm inventory**	**1**	**1**		**2**
9	**Concept of cooperative**	**1**		**1**	**2**
10	**Agriculture marketing and management**	**1**		**1**	**2**
11	**Marketing functions and Marketing channels**	**1**	**1**		**2**
12	**Price variation: Spatial and temporal**	**1**			**1**
13	**Conceptual meaning**	**1**	**1**		**2**
Total Question		**13**	**7**	**6**	**26**
Attempt Questions		**10**	**5**	**5**	**20**
Marks		**1x10=10**	**2x5=10**	**5x4=20**	**40**
Time		**18**	**18**	**39**	**75 min.**

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Aquaculture and Fisheries

Grade: 10 Theory: 40 Full Marks (68 Period) Practical: 60 Full Marks (102 Period)

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1. Introduction:

This course consists of technology, knowledge and skill about aquaculture and fisheries in high hills, mid hills and Terai. This course also consists of indigenous and exotic fish species, their identification and body identification. The sources of water and soil test is important for construction of fish pond. The fertilizers used in fish pond should be of good quality and they should be based on the habit and habitat of fish species. The identification of fish diseases should be at appropriate time and treatment of diseases. The predators on fish pond should be identified and adopt suitable control measures. In Nepal present situation of fisheries have gradually increases so rearing, harvesting, packaging and transportation of fish have been properly mentioned. In addition, curriculum includes pond fish culture, race way trout culture, aquarium management and ornamental fish culture, cage culture in lakes and reservoir, fish breeding, disease diagnosis and control, fish transport and marketing, aquatic animals and their environment etc. The problems and opprtunities in fish production are clearly identified and solution of these problems has also based on the technology used in fish production. The low cost production should be practised as far as possible.

2. Competencies

1. Conceptualize fish culture and explain site selection for fish culture,
2. Rear fish with modern system and utilization of old and traditional pond,
3. Explain natural and artificial breeding of fish
4. Identify fish diseases and control methods
5. Protect fish from predator and develop different feed for fish.

3. Learning Outcomes

At the end of Grade Ten, students will be able to:

1. Produce different species of fish

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction**	1.1 Basic principles of fish culture 1.2. Habit and habitat of improved fish varieties 1.3. Indigenous and exotic fish species, their identification and body structure 1.4. Farm design and pond construction	4
2.	**Construction of fish pond**	2.1. Pond survey and lay out 2.2. Soil test 2.3. Water source 2.4. Appropriate land for fish culture 2.5. Types of pond used in aquaculture, construction of dyke, inlet and out let 2.6. Cost estimation for pond construction	5
3	**Management of fish pond**	3.1. Cleaning and maintenance and use of lime in fish ponds 3.2. Preparation and management of fish pond 3.3. Use of feed and fertilizer in fish pond and its importance 3.4. Organic fertilizer 3.5. Chemical fertilizer 3.6. Pellet feed	5
4	**Importance of water quality in fish culture**	4.1. Water quality (Physical parameters) 4.2. Water quality (Chemical parameters) 4.3. Biological quality of water (Limnological	4

		parameters)	
5	**Fish culture system**	5.1. Mono culture (Tilapia, Pangasius, Common carp and Mangur) 5.2. Poly culture of fish and its importance 5.3. Importance of integrated fish farming (Fish cum livestock) 5.4. Fingerlings production in paddy field	7
6	**Common fish disease, prevention and treatment**	6.1. Fish disease, identification and control measure 6.2. Fish disease caused by parasite, their treatment and control measure 6.3. Bacterial and viral disease, treatment and control 6.4. Water quality parameters and their importance in fish culture	5
7	**Type of nets used in aquaculture and their protection**	7.1. Fry net 7.2. Drag net 7.3. Gill net 7.4. Cast net	**4**
8.	**Utilization of village ponds in fish culture**	8.1. Management and utilization of old ponds 8.2. Aquatic weeds and the control method 8.3. Fish predators and control methods	**6**
9	**Fisheries extension, marketing and preservation**	9.1. Present fisheries extension in Nepal 9.2. Harvesting method	**8**

		9.3. Use of ice for fish transport 9.5. Fish packaging method 9.6. Fish transportation method 9.7. Importance of fish marketing 9.8. Fish preservation methods: salting, smoking, freezing and canning 9.9. Cost benefit analysis	
10	**Fish brood management and breeding methods**	10.1Introduction of breeding 10.2. Types of breeding 10.3 Nursing methods of hatchling, fry and fingerlings	**3**
11	**Improved fodder grass used in Grass Carp**	**Improved fodder grass used in Grass Carp**	**4**
		11.1. Barsim grass	
		11.2. Nepiar grass	
		11.3 Sudan grass	
		11.4. Para grass	
		11.5. Ray grass	
12	**Fish farming in natural water bodies**	**Fish farming in natural water bodies**	**5**
		12.1. Conservation and management of Natural water bodies	
		12.2. Identification of fish species released in natural water bodies	
		12.3. Enclosure and cage culture in natural water bodies	

		12.4. Design and construction of raceways	
		12.5. Trout culture and production technology	
13	**Ornamental fish and aquarium management**	**Ornamental fish and aquarium management**	**4**
14.	**Problems associated with fish culture in Nepal and their solution**	14.1. Problems and opportunities in fish production	**4**
		14.2. Problems and solutions in fish prodution of Nepal	
	Total		**68**

PRACTICAL

S.N	Activities	Period
1	Identify external and internal organs of fish	**7**
2	Differentiate better of male and female fish	**6**
3	Layout and design pond	**4**
4	Identify the different Equipments and their uses in fish culture, breeding	**5**
5	Brood fish, fry and fingerlings pack and transport	**7**
6	Identification of planktons and weeds consumed by grass carp	**6**
7	Use of chemical and medicines in fish farming	**5**
8	Perform methods of fish seed stocking, growth check up, feed, fertilizer and lime application	**7**
9	Perform water quality test	**6**
10	Prepare snake trap to control snake	**7**

11	Prepare pellet method	**8**
12	Rear of fish hatchlings	**5**
13	Design of trout raceways	**6**
14	Differentiate between helthy and diseased fish	**6**
15	Prepare of drag net	**5**
16	Harvest fish using different methods	**6**
17	Pack fish in ice for transportaion upto market	**6**
	Total	**102**

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking

- Research methodology
- Written method
- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject: **Aquaculture and Fisheries**

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 10 Time: 1 Hour and 15 Min. Full Marks : 40

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	2	1		3
2	Construction of fish pond	2			2
3	Management of fish pond		1	1	2
4	Importance of water quality in fish culture	1	1		2
5	Fish culture system	1		1	2
6	Common fish disease, prevention and treatment		1	1	2

7	**Type of nets used in aquaculture and their protection**	**1**			**1**
8	**Utilization of village ponds in fish culture**	**1**			**1**
9	**Fish brood management and breeding methods**	**1**	**1**	**1**	**3**
10	**Improved fodder grass used in Grass Carp**	**2**	**1**		**3**
11	**Fish farming in natural water bodies**	**1**		**1**	**2**
12	**Ornamental fish and aquarium management**	**1**	**1**		**2**
13	**problems associated with fish culture in Nepal and their solution**			**1**	**1**
Total Question		**13**	**7**	**6**	**26**
Attempt Questions		**10**	**5**	**5**	**20**
Marks		**1x10=10**	**2x5=10**	**5x4=20**	**40**
Time		**18**	**18**	**39**	**75 min.**

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Vegetable and Medicinal Plant Production

Grade: 10 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

1. Introduction:

This course provides various principles and practices in the field of vegetable and medicinal plant. Production of vegetables in off season and climatic requirements for vegetables are to be provided by this course. This course also provides the techniques of commercial gardening and the production of species.

2. Competencies

1. Develop the concepts of the principles and practices of vegetable and medicinal plant production
2. Describe the production techniques of major vegetable crops and medicinal plants
3. Demonstrate off season production techniques and kitchen gardening.
4. Apply technical skills in main season vegetable seed production
5. Identify the major insects, pest and diseases of vegetables.

3. Learning Outcomes

At the end of Grade Ten, students will be able to:

1. Produce different vegetable crop and support national economy

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction**	1.1 Meaning and branches of horticulture 1.2 Definition of related terminologies 1.3 Importance and scope of vegetable and spices 1.4 Human nutrition and health 1.5 Source of income 1.6 Scope in Nepal 1.7 Classification of vegetables 1.8 Cultural requirements 1.9 Parts utilized 1.10 Growth habit 1.11 Introduction to garden tools and farm machinery	9
2.	**Vegetable farming**	2.1 Kitchen gardening 2.2 Truck gardening 2.3 Vegetable seed farming 2.4 Organic farming 2.5 Off-season farming 2.6 Peri-urban farming	7
3	**Climatic factors affecting vegetable production**	3.1 Temperature 3.2 Light 3.3 Rainfall and humidity	**4**

4..	**Cultivation practices vegetable and spices**	Cultivation of following vegetable crops with respect to nutritive value, trade, variety, climatic and soil requirements, nursery raising, planting, use of macro, micro nutrients, manuring, use of phytohormones, watering, weeding, insect pests, diseases, harvest, processing and marketing: 4.1 Solanaceous (potato, tomato, chillies and sweet paper) 4.2 Cole crops (cauliflower, cabbage, broccoli) 4.3 Cucurbits (cucumber, bottle gourds, bitter and pointed gourds) 4.4 Bulbs (onion and garlic) 4.5 Leafy (spinach, lettuce and broad leaf mustard) 4.6 Root (carrot and radish) 4.7 Leguminous (beans and peas) 4.8 Asparagus and okra 4.9 Ginger and turmeric	**16**
5.	**Off-season vegetable production**	5.1 Meaning, opportunities and problems 5.2 Techniques of off-season farming 5.2.1 Selection of crops for off-season 5.2.2 Hotbed preparation 5.2.3 Regulation of micro-climate 5.2.4 Plant protection measures **5.2.5** Use of plastic in vegetable farming	8

6.	**Medicinal and aromatic plants** (MAP)	7.1 Meaning, importance and comparative advantages of MAPs in Nepal 7.2 Classification of MAPs based on habit, habitat, use and economic values 7.3 Natural distribution of MAPs in ecological zones of Nepal based on topography and climate 7.4 Important traded and cultivated MAPs of Nepal 7.5 Cultivation, production, trade, industrial values and use of some of the cultivated MAPs in Nepal **7.6** Economic importance of unexploited MAPs as potential non-timber forest products (NTFP) based enterprises in Nepal	10
7	**Vegetable seed production**	8.1 Importance and status of vegetable seed production in Nepal 8.2 Classification of vegetables based on mode of pollination 8.3 Variety maintenance and seed multiplication 8.4 Introduction to hybrid seed production 8.5 Techniques of vegetable seed production of: 8.5.1 Potato and tomato 8.6 Seed quality testing	14
		Total	68

PRACTICAL

S.N	Activities	Period
1	Identify vegetables / vegetable seeds	**3**
2	Identify garden tools and farm machines	**3**
3	Identify phytohormones, major and micro nutrients (solid and liquid) used in vegetable farming	**4**
4	Identify spices of vegetable	**3**
5	Perform germination test for vegetable seeds	**7**
6	Prepare / maintain vegetable nursery	**10**
7	Prepare land for transplanting vegetables	**8**
8	Develop yearly calendar of kitchen gardening	**6**
9	Identify major insect pests / diseases of major vegetables	**8**
10	Identify nature of damage of important insect pests / diseases	**6**
11	Spray insecticides / fungicides for insect / disease control	**8**
12	Perform cultural operations (mulching/manuring/training/earth up etc)	**8**
13	Prepare *Sutho*	**5**
14	Prepare hotbed / plastic tunnel for off-season production	**5**
15	Keep records of inputs / sale and calculate cost / profit of vegetables	**3**
16	Visit to spice or herbal processing plant	**8**
17	Visit vegetable farm	**7**
	Total	**102**

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology
- Written method
- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject:Vegetable and Medicinal Plant Production

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 10 Time: 1 Hour and 15 Min. Full Marks: 40

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	2	1	1	4
2	Vegetable farming	1	1	1	3
3	Climatic factors affecting vegetable production	2	2		4
4	Cultivation practices vegetable and spices	2	1	1	4
5	Off season vegetable production	2	1	1	4
6	Medicinal and aromatic plants	2	1	1	4
7	Vegetable seed production	2		1	3
Total Question		13	7	6	26
Attempt Questions		10	5	5	20
Marks		1x10=10	2x5=10	5x4=20	40
Time		18	18	39	75 min.

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Food crop production

Grade: 10 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

1. Introduction:

This course provides the theoretical knowledge as well as practical skills to the students in crop production of cereal crops such as rice, wheat, maize, oil seed crops such as mustard, sunflower, linseed and legume crops such as lentil, chick pea, cow pea and pigeon pea this also includes practices and principles of successful production of major industrial crops and their processing techniques.

2. Competencies

1. Explain the principles of crop husbandry as related to successful production of major field crops
2. Cultivate the major and minor crops like rice, maize, wheat, oil seeds, pulses and industrial crops.
3. Describe the relationship between crop productivity and cultural practices
4. Identify common insects, pest/diseases of agronomical crops
5. Be familiarized with agronomical practices for production of cereals, oil seeds, grain legumes, cash and industrial crops

3. Learning Outcomes

At the end of Grade Ten, students will be able to:

1. Increase yield potential of cereal crop.
2. Increase income sources through production of industrial crop
3. Contribute to food security through production of cereals, oil seed crop.

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction**	1.1 Definition of subsistence and commercial agriculture 1.2 Classification of agronomical crops (Cereals, Oil seeds, Grain legumes, cash and industrial crops) 1.3 Importance and scope of agronomical crops in Nepal 1.4 Comparative advantage of agronomical crops in Nepal 1.5 Geographical distribution of agronomical crops in Nepal	5
2.	**Cultivation of cereal**	Study of the following crops with respect to distribution, area, production, trade, climate, soil, variety, land preparation, manure, seed treatment, nursery preparation, time and method of sowing, irrigation, weeding, insect pest, disease, harvesting, yield, storage and economics of production: 2.1 Rice 2.2 Wheat 2.3 Maize	**16**
3.	**Cultivation of oil seeds**	Study of the following crops with respect to distribution, area, production, trade, climate, soil, variety, land preparation, manure, seed treatment, nursery preparation, time and method of sowing, irrigation, weeding, insect pest, disease, harvesting, yield, storage and economics of production: 3.1 Rapeseed and mustard 3.2 Sunflower 3.3 Linseed	15

4	**Summer and winter grain legume production**	Study of the following crops with respect to distribution, area, production, trade, climate, soil, variety, land preparation, manure, seed treatment, nursery preparation, time and method of sowing, irrigation, weeding, insect pest, disease, harvesting, yield, storage and economics of production: 4.1 Lentil 4.2 Chick pea 4.3 Cowpea 4.4 Pigeon pea	15
5	**Cultivation of industrial crops**	**Cultivation of industrial crops (15)** Study of the following crops with respect to distribution, area, production, trade, climate, soil, variety, land preparation, manure, seed treatment, nursery preparation, time and method of sowing, irrigation, weeding, insect pest, disease, harvesting, yield, storage and economics of production: 5.1 Sugarcane **5.2** Tobacco	**17**
		Total	**68**

PRACTICLE

Unit	Activities	Period
1	Identify seed and plants of agronomical crops and prepare herbarium file	**12**
2	Calculate the doses of fertilizers and apply as basal and top dressing	**10**
3	Collect/ identify weeds of common crops	**15**

4	Collect/ identify common insect pests and diseases of the agronomical crops	**15**
5	Calculate / spray pesticides to control pests and diseases	**10**
6	Treat seeds and sugarcane with fungicides for sowing	**10**
7	Carryout special field operations needed for : a. Tobacco- • Perform de-suckering • Perform priming • Perform curing b. Sugarcane- • Perform propping • Perform wrapping • Plant various types of planting materials	**20**
8	Study the processing of sugarcane/tobacco (Visit to the cotton, sugarcane, and tobacco industries)	**10**
	Total	**102**

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method

- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology
- Written method
- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject :**Food crop production**

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 10 Time: 1 Hour and 15 Min. Full Marks : 40

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	3	2		5
2	Cultivation of cereal	3	2	2	7
3	Cultivation of oil seeds	2	1	2	5

4	**Summer and winter grain legume production**	**2**	**1**	**1**	**4**
5	**Cultivation of industrial crops**	**3**	**1**	**1**	**4**
Total Question		**13**	**7**	**6**	**26**
Attempt Questions		**10**	**5**	**5**	**20**
Marks		**1x10=10**	**2x5=10**	**5x4=20**	**40**
Time		**18**	**18**	**39**	**75 min.**

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Industrial Entomology and Mushroom cultivation

Grade: 10 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

1. Introduction:

This course provides basic knowledge and skills for bee keeping, sericulture and mushroom cultivation practices used in Nepal. This is an enterprise related course. At the end of this course student will be able to start their own business with very low cost and space.

2. Competencies

1. Identify bee species for keeping purpose
2. Identify equipments in use for bee keeping
3. Keep bee for income generation
4. Explain life cycle of honey bee
5. Identify suitable variety of mulberry and cultivate suitable variety for silkworm
6. Explain life cycle of silkworm and mushroom
7. Rear harvest and market cocoon
8. Identify edible species & cultivate mushrooms

3. Learning Outcomes

At the end of Grade Ten, students will be able to:

1. Produce and do marketing of Mushroom
2. Rear silkworm and produce silk fibers
3. Produce honey

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Beekeeping**:	1.1 Introduction 1.1.1.Definition, general terms 1.1.2.Importance and scope 1.1.3.Bees and pollination 1.1.4.Varieties of bees 1.1.5.Beekeeping in Nepal 1.2 Biology and Bee colony 1.2.1 Life cycle 1.2.2 Types of bees 1.2.3 Bee colony and management 1.2.4 Bee product 1.3 Apiaries and management 1.3.1 Site selection and establishment 1.3.2 Handling of bees 1.3.3 Selection of hive and baiting 1.3.4 Colonization and stocking 1.3.5 Swarming 1.3.6 Combs and their management 1.3.7 Pest, predators and disease 1.3.8 Harvesting and post harvest handling 1.4 Foraging and equipment	4 7 17 4

		1.4.1 Protective wear and equipment 1.4.2 Hives, their types and selection 1.4.3 Foraging of bees	
2.	**Sericulture**	2.1 Introduction 2.1.1 General terms and definition 2.1.2 Importance , scope 2.1.3 Silkworm in Nepal 2.2 Mulberry cultivation 2.2.1 Sapling production and Nursery management 2.2.2 Establishment of new mulberry garden 2.2.1.1 Site selection 2.2.1.2 Plantation 2.2.3 Garden management 2.2.3.1 Garden management for young age silkworm rearing 2.2.3.2 Garden management for late age silkworm rearing 2.2.4 Insect pest and disease management 2.2.4.1 Major insects 2.2.4.2 Major disease 2.2.4.3 Integrated pest management in Mulberry 2.3 Silkworm rearing 2.3.1 Introduction, life cycle and mechanism of silkworm rearing	**4** **9** **9**

		2.3.2 Materials management for rearing 2.3.3 Egg management and incubation 2.3.4 Young age silkworm rearing 2.3.5 Late age silkworm rearing 2.3.6 Mature worm and mounting 2.3.7 Cocoon harvesting and sorting 2.3.8 Disease and pest management 2.4 Cocoon assessment 2.4.1 Introduction of cocoon, cocoon quality and classification 2.4.2 Characteristics of cocoon 2.4.3 Management steps of cocoon 2.4.4 Harvesting and handling of fresh cocoon 2.4.5 Post harvest activities 2.5 Silk production 2.5.1 Filature 2.5.2 Twisting 2.5.3 Degumming 2.5.4 Dying 2.5.5 Weaving	**5** **2**

3	**Mushroom cultivation**	3.1 Introduction 3.1.1 Definition, importance and scope 3.1.2 Types of mushroom 3.1.3 Mushroom cultivation in Nepal 3.1.4 Poisonous mushroom available in Nepal	7
		Total	68

PRACTICAL

S. No.	Particular	Period
1.	Identification of different varieties of bees	2
2.	Life cycle of bees	3
3.	Identification of types and stage of bees	3
4.	Handling of bee colony	2
5.	Joining and separation of colony	3
6.	Queen production and management	5
7.	Hive preparation/handling	3
8.	Use of different protective wearing and equipment	2
9.	Honey and wax extraction	3
10.	Identification of different disease and pest	3
11.	Practice on management of disease and pest	3
12.	Identification of silkworm	2
13.	Life cycle of silkworm	3
14.	Propagation of mulberry	4
15.	Nursery establishment and care take	12
16.	Plantation of mulberry orchard	9
17.	Care and management of orchard	5
18.	Module of rearing house	7
19.	Leaf harvesting	2
20.	Mounting	2
21.	Identification of different types of cocoon	2
22.	Identification and practice	2
23.	Identify and management of different disease and pest on cocoon	2

24.	Field visit of silk rearing	9
25.	Cultivation of different types of mushroom like keney, bottom, parale and sittake (visit nears mushroom farm)	9
	Total	102

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology
- Written method
- Supervision method
- Observation method
- Exhibition method

- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject :Industrial Entomology and Mushroom cultivation

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 10 Time: 1 Hour and 15 Min. Full Marks : 40

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Bee keeping	5	2	3	10
2	Mushroom cultivation	4	3	2	9
3	Silk worm production	4	2	1	7
Total Question		13	7	6	26
Attempt Questions		10	5	5	20
Marks		1x10=10	2x5=10	5x4=20	40
Time		18	18	39	75 min.

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60

Floriculture and Nursery Management

Grade: 10 **Theory: 40 Full Marks (68 Period)** **Practical: 60 Full Marks (102 Period)**

1. Introduction:

This course is designed to develop necessary skills and knowledge of horticultural techniques required for general nursery management, plant propagation, flower production and landscaping. This course provides various principles and practices in the field of plant propagation, nursery techniques and basic principles and practices for the flower cultivation and land beautification indoor and outdoor gardening.

2. Competencies

1. Explain the role of floriculture in economic development
2. Identify the suitable ornamental plants grown in different agro climatic regions.
3. Design landscape and maintain lawn
4. Cultivate the major ornamental plants of the country
5. Establish nursery for ornamental plants
6. Practice on different types of propagations

3. Learning Outcomes

At the end of Grade Ten, students will be able to:

1. Produce different flowers and ornamental plant and their marketing

4. Scope and Sequence

THEORY

Unit	Scope	Content	Period
1.	**Introduction**	1.1 Meaning, importance and scope and challenges of floriculture in Nepal 1.2 Current status of floriculture in Nepal 1.3 Classification of ornamental plants (Seasonal , growth habitant perennial)	4
2.	**Garden**	5.1 Meaning, scope and importance 5.2 Garden types 5.3 Concept of landscape gardening 5.4 Principle of landscape design **5.5** Preparation and maintenance of lawn	**7**
3	**Ornamental plants**	3.1 Cultivation with respect to uses, variety, soil and climatic requirement, planting, maturing, training and pruning, disease and insect control of a. Gladiolus b. Rose c. Carnation d. Gerbera e. Tuberose f. Marigold g. Chrysanthemum h. Orchid 3.2 indoor gardening -selection and maintenance -pot culture and hanging basket - introduction of bonsai making -Post harvest management of flowers and	21

		vase life	
4	**Introduction to nursery**	4.1 Definition of nursery 4.2 Type of nurseries 4.3 Importance and scope in Nepal	3
5	**Nursery containers**	5.1 Characteristics of media 5.2 Properties and use of 5.2.1 Soil 5.2.2 Sand 5.2.3 Compost 5.2.4 Vermiculite 5.2.5 Sphagnum moss 5.3 Mixture for container growing 5.4 Treatment of media and mixes	3
6	**Nursery containers**	6.1 Clay pots 6.2 Plastic pots 6.3 Polyethylene bags	1
7	**Nursery structures**	7.1 Hotbed 7.2 Plastic tunnel 7.3 Greenhouse	**3**
8.	**Propagation from seeds**	8.1 Merits and demerits 8.2 Collection of tree seeds 8.3 Seeds: viability and germination 8.4 Seed dormancy and its causes 8.5 Breaking seed dormancy 8.6 Preparation of seedbed	**8**

		8.7 Seedbed treatment and sowing 8.8 Care and maintenance of seedling 8.9 Packaging and marketing	
9.	**Vegetative propagation**	9.1 Reasons for using vegetative propagation 9.1.1 Propagation of seedless plants 9.1.2 Avoidance of long juvenile phase 9.2 Methods of propagation 9.2.1 Cutting 9.2.1.1 Advantages and disadvantages 9.2.1.2 Different techniques 9.2.2 Layering 9.2.2.1 Advantages and disadvantages 9.2.2.2 Different techniques 9.2.3 Grafting and budding 9.2.3.1 Merits and demerits 9.2.3.2 Different techniques	**18**
		Total	**68**

PRACTICAL

S.N	Activities	Period
1	Identify ornamental plants: seasonal and perennials	3
2	Introduction of commonly used tools for gardening and lawn making	3
3	Prepare nursery / annual beds	3
4	Prepare media / soil mixture for container grown plants	4
5	Collect seeds for propagation	4
6	Treat seed for breaking dormancy	4
7	Sow seeds / transplant seedlings	6
8	Prepare potting mixture	4
9	Potting and repotting of ornamental plants	4
10	Perform training / pruning of ornament plants	4
11	Prepare lawn	4
12	Prepare landscape designs for residential / public building / park	8
13	Select flowers and perform flower arrangements	4
14	Prepare cuttings of ornamental plants	4
15	Prepare soil /air layering	4
16	Prepare grafting / budding	4
17	Care /maintain nursery plants	4
18	Garden sanitation for ensuring disease and pests management	4
19	Prepare plastic tunnels / hotbed	4
20	Perform packaging / handling / marketing of nursery plants	4

21	Identify ornamental plants: seasonal and perennials	**4**
22	Introduction of commonly used tools for gardening and lawn making	**4**
23	Prepare nursery / annual beds	**5**
24	Prepare media / soil mixture for container grown plants	**6**
Total		**102**

5. Learning facilitation process

Specific objective of this curriculum is to develop the specific knowledge on Agriculture sector including the upliftment in sociological behaviour. Combining both the technical as well as practical materials, this subject targets in developing knowledge, skill & entrepreneurship in every student. Too meet the required achievements, the teacher must promote the outdoor and indoor activities favoring the curriculum also we welcome the creativity in the teaching procedure. The materials used for learning may be local as well as specified regarding to the requirement of process.

The teaching method and material of each unit is well elaborated in this section. To meet the objective of this curriculum the participation of students in group work, implementation on existing environment, presentation skill development, project complexion and research methodology are subjected as the key points.

Some important teaching learning methods that can be adopted are given below:

- Visual method
- Demonstration method
- Presentation method
- Project work
- Practical method
- Creative thinking
- Research methodology
- Written method

- Supervision method
- Observation method
- Exhibition method
- Listening method

6. Students Assessment Process

Class work, homework, unit test, terminal test, final test, etc. are the tools to measure student's knowledge, skill, and performance. Similarly, lab report, attendance, discipline, and performance are also used to assess the learners' achievement.

Specification Grid

Subject :Floriculture and Nursery Management

In this subject, to evaluate the students knowledge, skill, attitude and performance, the questions are divided into two group i. e. Theory and Practical. For theoretical part questions and weightage are given in table A, bellow:

Table A

Class: 9 Time: 1 Hour and 15 Min. Full Marks : 40

Unit	Scope	Group A	Group B	Group C	Total Question
		Very Short Question	Short Question	Long Question	
1	Introduction	2	1	1	4
2	Garden	1	1	1	3
3	Ornamental plants	2		1	3
4	Introduction to nursery	2	1	1	4
5	Nursery containers	1	1		2
6	Nursery containers	1	1		2
7	Nursery structures	1	1		2
8	Propagation from seeds	1		1	2

9	**Vegetative propagation**	2	**1**	1	**4**
Total Question		**13**	**7**	**6**	**26**
Attempt Questions		**10**	**5**	**5**	**20**
Marks		**1x10=10**	**2x5=10**	**5x4=20**	**40**
Time		**18**	**18**	**39**	**75 min.**

(PRACTICAL)

Time: 1 Hour and 45 Min. **Full Marks: 60**

For Practical examination 60 full marks is divided as follows:

Allocation of practical marks	Marks
Attendance	5
Lab report/Practical files	10
Internal assessment	10
Practical Examination	15
Spotting/field report/project work/survey report/drawing	10
Viva	10
Total	60