

Syllabus for 1 year Diploma in ‘Agriculture and Rural Development (DARD)’

Course Contents

Sl. No.	Course No.	Course Title	Credit Hours
Semester-I			
1	DARD-101	Basic Agriculture	3+4
2	DARD-102	Organic Agriculture	3+5
3	DARD -103	Crop Management	2+3
4	DARD -104	Animal Rearing	2+3
5	DARD -105	Basic Computer Application	0+3
6	DARD -106	Rural Living I (2 weeks)	0+2
Total Credit in Semester-I: 10+ 20 (Th +Pr)= 30			
Semester-II			
1	DARD - 201	Rural Development: Panchayati Raj Institutions and Village Planning	3+4
2	DARD -202	Rural Resources Management	2+4
3	DARD - 203	Basic Extension Education	3+2
4	DARD - 204	Value Education	2+0
5	DARD -205	Institutional Work Experience (6 weeks)	0+10
Total Credit in Semester-II: 10+20 (Th +Pr)= 30			
Total Credit for Diploma in DARD = 20 + 40 (Th +Pr) = 60			

First Semester

DARD - 101 Basic Agriculture

3+4

1. Concepts, definition and component of agriculture: Definition of Agriculture; Classification of Agriculture; Concepts of Agriculture; Components of Agriculture.
2. **Climate:** Physical features of climate; Agro-Climatic and agro-ecology Zones of India (with map).
3. **Soil:** Definition and components of soil. Physical properties of soil - Soil texture, soil structure, density of soil, porosity of soil, soil temperature and their role in soil fertility, Nutrient availability in soil; Soil analysis and its importance; Soil test based fertilizer recommendations to crops, Problematic Soil: Nature and classification, characteristics, detrimental effects of soil acidity, salinity and alkalinity and their reclamation, Soil types in Jharkhand, Role of organic matter in crop production
4. **Crops:** Seasonal classification of Crops: Kharif crops; Rabi crops; Zaid crops; General Classification of crops:- Cereals, pulses, millets etc. & their differences.
5. **Cropping system** (like mono-cropping, sequence-cropping etc.) – definition with examples; Cropping pattern - definition with examples and Crop rotation - definition, Principles of crop rotation & its advantages.
6. **Seed technology:** Definition, different stages and quality of seeds; Importance of improved seed; Principles and techniques of seed production; Seed processing – Steps only.
7. **Horticulture:** Definition, branches, importance, scope, current scenario *etc.*
8. **Olericulture:** Olericulture definition, importance and scope, classification of vegetables, cultivation of some important seasonal vegetables of Jharkhand.
9. **Pomology:** Pomology definition, importance and scope, classification of fruits, production technology of different tropical and sub-tropical fruits in Jharkhand.
10. **Ornamental Horticulture and Landscape Gardening:** Scope and importance, Flower gardens, types and styles of garden, lawn, hedges, production technology for important flowers of Jharkhand.
11. **Medicinal and aromatic plants:** Importance and scope, production technology of different important medicinal and aromatic plants in Jharkhand.
12. **Propagation and Nursery Management:** Nursery definition, quality, components of nursery, sexual and asexual propagation, different methods of asexual propagations, advantages and dis-advantages of sexual and asexual propagation

Practical:

1. **Identification of various crops including their seeds and development of knowledge on cultivation techniques for different seasonal annual crops:** Kharif

season crops, Rabi season crops, Zaid season crops, Preparation of a crop calendar, Preparation of seed album for different crop's seed.

2. **Identification and calculation of required doses commercial fertilizers**
3. **Identification and use of farm implements:**
4. To draw the figures mentioning different parts of agricultural implements in practical note-book with following information.
 - a. **Difference and use** of country plough and mould board plough
 - b. Identification of sprayers and its usage
 - c. Zero tillage machines
 - d. Land leveler machine & other modern implements.etc.
5. Collection of representative soil sample for laboratory testing, Estimation of available macro and micronutrient in soil, soil test based recommendation
6. Improved nursery bed for raising flowers and vegetables.
7. Planning and layout of kitchen garden.
8. Preparation of pit for planting fruit trees.
9. Identification of important herbs, shrubs, climbers and pot plants.
10. Identification of medicinal and aromatic plants along with their uses.
11. Identification of seeds or other planting materials of different horticultural crops, budding, grafting, air layering *etc.*
12. Value addition of horticultural crops

DARD - 102 Organic Agriculture

3+5

1. **Organic farming:** Concept and definition, objectives, need of the nation, advantages and limitations; integrated organic farming- concept, ideal for small and marginal farmers of rain fed regions.
2. **Low cost or no cost production technologies for growing vegetables, field crops and fruit plants,** an introduction and uses of some indigenous technical knowledge (ITK) and resource conserving techniques (RCT), cost-benefit ratio in organic farming *vis-a-vis* inorganic farming, two casestudies.
3. **Compost--** Different methods of composting like NADEP method, speed method, pit method, heap method from crop residues, cow dung and poultry litters.
4. **Earthworms and vermitechnology:** Classification, role of earthworms in agriculture to improve physical, chemical and biological properties of soil and quality of products, anatomy of earthworm; enemies of earthworm; Vermi-technology-concept, vermiculture, vermicomposting - steps , heap or bed method, steps in vermicompost production and collection, factors influencing culturing of earthworm, earthworm feed and vermi-conservation.
5. **Organic control of insects and diseases of plants:** Definition of bio-pesticide; plant extracts used as bio-pesticide; botanicals like neem extract *etc.*, virus, bacteria and fungi as bio-pesticide; role of beneficial fungi in the control of plant diseases; organic control of nematodes to minimise plant deformities.
6. **Vedic agriculture:** An introduction to Vedic agriculture with reference to Vrikshayurveda; **Panchagavya** and crop production, scientific rationale for efficacy of panchagavya on crop growth and productivity.

7. **Bio-dynamics in agriculture:** Concept, scope, importance and its application in agriculture.
8. **Natural farming**-concept and definition, advantages and constraints in natural farming.
9. 5. Crop rotations for low, medium and upland of Jharkhand under rainfed and irrigated conditions.

10. Certification and accreditation process of organic product

Practical:

1. **Study of different organic materials**
2. Preparation of compost through various methods like NADEP, speed, pit and heap from crop residues, cow dung as well as poultry litters
3. Preparation of vermicompost, vermiwash and techniques of vermiculture- both in farm as well as in field.
4. Preparation of poudh sanjivani (PS) and Beej Sanjivani(BS) from cattle urine and cow dung and their uses in agriculture.
5. Preparation and use of Panchagavya to increase fertility of soil, control disease and insects.
6. **Study of recycling of farm waste, Study of green manuring, Visit to urban waste recycling unit**
- 7 . Preparation of horn manure BD-500 and its application in field.
8. Preparation of BD-50 (cow horn silica)- steps, result and application
- 9 Cultivation and record keeping of at least four crops using low cost inputs for integrated organic farming.
- 10 Preparation of plan for a model organic farm of 1 acre.
- 11 Visit to an organic farm (if possible).

1. Integrated Disease Management

1.1 Objectives of plant pathology, major aspects of study in Plant Pathology, Crop diseases and their causal agents- i) Biotic and ii) Abiotic.

1.2 Symptoms, etiology, epidemiology and management of major diseases of cereals, pulses, oilseeds, fruits and vegetables of Jharkhand.

1.3 What is IDM?

Economic threshold, Cultural method, Physical method, Biological method, Chemical method Integrated management.

2. Integrated Pest Management

2.1 Concept needs, aims, principles and future perspective, pest control vs pest management, ecology and economy of pest control techniques, agro-ecosystem analysis for decision making in IPM.

2.2 IPM tools: Overview of pest control techniques: monitoring, resistant varieties, mechanical, cultural, biological, genetic, and chemical control; pest surveillance and forecasting, beneficial pests, Neem and pest management, Preparation techniques of botanicals and biological pesticides, Dos and Do nots of IPM.

2.3 IPM techniques in major crops (cereals, oilseeds, sugarcane, cotton, pulses, common vegetables and fruit trees),pesticide residues, pest resurgence and rationale of chemical control, role of pesticides in IPM, effect of weather and soil on pest, success stories of IPM.

Practical

1. Identification of pests and diseases, damage symptoms, beneficial insects, application of plant based pesticides, fungicides and bio-control agents, usage of insecticide, fungicides appliances, inventory of indigenous pest and disease management techniques, application of ETL concept at field level.
2. Classification of pesticides on the basis of their chemical composition.

Animal Rearing

2+3

DARD - 104

A. Livestock Farming:

1. Introduction to animal husbandry. Brief history; Livestock resources in Jharkhand.

Dairy farming as an industry; Problems of dairying;

2. (a) Indian and exotic breeds of cattle, Buffalo, Sheep, Goat, Pig etc. with specific characteristics of breed and production. Breeds suitable for Indian climate (pure as well as cross breed). Breeding methods – grading up; cross breeding; qualities of cross breed animals; signs of heat; habitation. Milking – methods, principle, types of milking. Difference between full hand milking and stripping. Machine milking – advantages, disadvantages and method

(b) Feed Nutrients, fodders and their conservation; care and management of livestock. Special mention to ruminant animal; Diseases and Treatments in details. Diseases of cow – bacterial, viral, fungal, parasitic, protozoan diseases – symptoms, treatment and prevention. Nutritional deficiencies

3. Livestock farms – their requirements, financial institutions for credit, record keeping, and importance of Integrated farming systems. Model of dairy farming – manpower, time, cattle farm activities, health, breeding, culling procedure, feeding, milking, financial viability, cleanliness and hygiene, general management, records - birth register.

B. Poultry and Duck Farming:

1. Introduction, Brief history, Poultry resources in Jharkhand. Concept; classification of fowls; terminology – class, breed, varieties, strains; class – wise bird classification – American, English, Asiatic etc.

2. (a) Indian and exotic breeds of Poultry with specific characteristics of breed and production. 'Divyayan Red' its characteristics; Diseases and Treatments of poultry. Digestive system of poultry and its function; brooding and rearing – natural brooding and artificial brooding; management of chicks in the brooder; poultry nutrition Disease- Parasitic, viral, bacterial diseases – symptoms and treatment.

(b) Duck's breeds and their rearing procedures; Diseases and control; Special rearing of 'Khaki cambell' breed. Advantages of duck rearing, common breed of duck Viral disease, bacterial, parasitic disease – symptoms and treating.

3. Poultry farms – their requirements, financial institutions for credit, record keeping, importance of Integrated farming systems. Hay and Silage making.

Housing – essential of good housing, location of poultry house, soil and drainage etc.; House construction. Intensive farming system – battery system, deep litter system. Hay making – suitable crop for hay making, methods of hay making, various methods of drying. Silage making – advantage, methods, factors affecting nutritive value of silage. Characteristic of Silos

Practical: Dairy

1. Approaching and handling of the animals.
2. Identification of common breeds of domestic animals (Cattle, Bull, Sheep, Pigs).
3. Identification of farm animals.
4. Castration & dehorning of the animals.
5. General principle for the housing of the animals.
6. Identification of common fodder and feeds.
7. Formulation of balanced ration with available conventional and unconventional ingredients.
8. Common methods of castration of different domestic animals
9. Identification of common diseases and their treatment.
10. Vaccination and deworming schedule in cattle, bull, goat, pig and poultry.
11. First aid practices like – disbudding, debeaking, wound dressing, recording of temperature, cut-injury, tooth cutting in piglets.
12. Detection of heat (oestrus period) in dairy animals.
13. Different methods of milking.
14. Calculation of economy of a Dairy Farm and finding out Cost-Benefit Ratio.

1. Fundamentals of computer
2. Microsoft Office Word
3. Microsoft Office Excel
4. Microsoft Office Power Point

SECOND SEMESTER

DARD - 201 Rural Development: Panchayati Raj Institutions and Village Planning

3+4

1. Emergence of the concept and evolution of the local self-government in India.

- i) Emergence of PRIs
- ii) Milestone of Indian decentralization
- iii) Phases of Panchayati Raj
- iv) Concept of PRIs
- v) Evolution of PRIs

2. Historical perspective of earlier PRIs – success and failure

- i) Historical perspective of PRIs
- ii) Comparison between ancient & modern panchayat
- iii) Success of PRIs
- iv) Failure of PRIs

3. Special features of the Constitution of India (73 Amendment) Act, 1992 and the 74th Amendment Act, 1992 and the state conforming Acts like Article 40 of the constitution.

4. Three – tier system: village panchayat, block committee and district board.

Functions, activities monitoring & election

- a) First tier- Village panchayat
- b) Second tier – Block committee (Panchayat Samati)
- c) Third tier – District board (Zilla Parishad)

5. Constitution and role of gram sabha in rural development.

- i) Constitution of gram sabha
- ii) Election of member's quorum of meeting
- iii) Role of gram sabha
- iv) Functions & activities of gram sabha.

6. The meaning and the effect of the provisions of the eleventh and twelfth schedule of the Constitution of India and the present status.

7. Features of the provisions of Panchayat (Extension of the scheduled Areas) Act 1996 and the conforming state acts. Including Jharkhand Panchayat Act 2001 and tribal panchayat system of Jharkhand.

8. PRA tools and Techniques.

Origin of PRA, Features of PRA- Iterative, innovative, interactive, informal, in the community. PRA and rural development, Principles of PRA- optimal ignorance, seeking diversity, offsetting biases and triangulating, participatory learning. Foundation of PRA- attitude and behaviour, methods and sharing.

PRA vs. RRA, LEAP method. General tools and specific tools of data collection. Selected PRA tools- Participatory mapping, activity calendar, socio-economic data, mobility map, household interview, review of secondary data, Seasonality calendar, timeline, mapping, transect mapping and Decision making matrix

9. Rural Development- Indian Thinkers

- i) Swami Vivekananda's concept of rural and tribal development in India
- a) Concept and definition of 'Integrated Rural and Tribal Development'.
- b) Character building through development of five levels and self-reliance.
- c) Basic postulates in the developmental philosophies of Swami Vivekananda.
- d) Guidelines for rural development
- e) Vision for rural development

- f) Evolution of Ramakrishna Mission- a case study
- g) Success story of Coorg, Sagar Island, Havibganj, Khashi Hills(any one).
- ii) Rabindranath Tagore's vision on rural and tribal development in India
- a) Rabindranath Tagore's philosophies, basic principles,
- b) Plan for development of a model village and instructions for rural development workers.
- c) Sriniketan project – objectives, performances and experiences.

10. Rural development in Jharkhand:

Different developmental programs in Jharkhand- CDP, SMPTB, TDB, TDA, PTGs, ITDP, MADA etc.

Tribal sub plans, success and drawbacks of programs related to rural and tribal development in Jharkhand. Agencies and institution working in the areas of rural and tribal development.

11. Issues and challenges of rural and tribal development in Jharkhand.

Problem of Drinking water; Sanitation; health & hygiene. Bonded labour; Indebtedness; Housing; Liquor & so on.

Practical

Conducting different techniques of PRA for village planning.

1. Farm management

2. Concept and definition, scope, importance, utility of farm management, objectives of farm management, nature of farm management, characteristics and problems, categories of cost like fixed cost, marginal cost opportunity cost etc.

3. Principles involved in farm management decisions

Law of substitution, law of least-cost combination of inputs, law of equi-marginal return, law of combining enterprises. Tools of farm management analysis - farm planning, objectives of farm planning, principle characteristics of a good farm plan, information needed for planning and budgeting,

4. Management of farm finance, farm resources, farm labour and farm machinery.

5. **Farm Financial Management:** Definition, financial management decisions, problems, importance to the farmer – borrower, importance of lending agencies and farm credit advisory services. Role of credit in production and marketing; economic feasibility tests of a farm credit proposal; 3 R s – repaying capacity, returns and risk bearing capacity.
6. **Entrepreneurship:** Definition and Concepts, Characteristics Elements, Process, Need for Entrepreneurship; Entrepreneurial qualities and classification - Classification of entrepreneurs – Spontaneous, Motivated and Induced.
7. **Types of rural markets** – Farm sector and Non Farm sector, difference between traditional marketing and urban marketing, Benefits of rural marketing – Physical, social and economic benefit, Demerits of traditional rural market, traditional and future expansion of rural markets, Challenges of future market, Perspective of rural marketing. Cooperation, Principles of cooperation, farmer producer organization and other cooperative organization.

8. Concept and meaning of watershed development: definition, characteristics, principles and objectives, benefits and components.
9. Watershed and people: People's participation, watershed development team, watershed association and committee, Role of PRI in watershed
10. Watershed treatment – land development, water harvesting, storage and control of water, farming systems and production technology.

Practical

1. Preparing action plan for watershed development
2. Documentation, evaluation and reporting of success stories or case studies on watershed.
3. Preparation of project proposal of an agro-based entrepreneurship (2 projects) Goal, objective /problem, strategy and formulation, budgeting, plan of implementation, operation and monitoring, evaluation and follow-up.
4. Formulation of a plan for integrated development of a village.
5. **Establishing entrepreneurial systems** – Identification, Formulation Appraisal, Implementation, Monitoring, and Evaluation.
6. Visit to rural markets

DARD - 203 Basic Extension Education

3+2

1. Group: Definition, characteristics and types group morale, group dynamics methods of group work principles and processes of involving people.

2. Rural Sociology and Educational Psychology.

i) Attitude – concept, theories of attitude change- Consistency theories, Non-consistency theories, functional theories, cognitive and perceptual theories.

-Attitude formation and attitude change- Process of change, Influencing factors- target characteristics, source characteristics, message characteristics and cognitive routes.

Stages of attitude change- Compliance, Identification, Internalization. Informational influence Vs. Social Comparison. Management of attitude and value change.

ii) Perceptual process: External vs. Internal factors influencing.

Definition, and characteristics. Types of Perception – Detection, recognition and discrimination. Factors influencing perception – As per Wells, Zaltman and Walleldorf.

iii) **Personality:** Definition- Personality as stimulus, summative approach, Characteristics of personality. Theories of personality – Psychological theories – type theory, trait theory, psycho-analytic theory, phenomenological theory, learning theory, social – behavior theory etc. Anthropological theory –

cultural determines personality, personality build culture, culture and personality are inter influencing.

Determinants of personality- environment, culture, heredity, peculiar experience.

Concept of intelligence quotient (IQ), emotional quotient (EQ), and Spiritual Quotient (SQ).

iv) **Motivation:** Concept, functions of motivation, Factors, Theories- Morgan's theory, Maslow's theory of self actualization, Characteristics of self-actualizers learning based theory of motivation- E.L.Thorndike.

3. Leadership

Definition, concept role and function of leaders, types of leader follower relationship, leadership and leader behaviour, kinds of leaders in the rural community, general characteristics of lay leader, identifying leaders, responsibility of extension worker in leadership development, emerging pattern of leadership in Indian villagers, training leaders for leadership in extension programme (case studies and empirical findings pertaining to group dynamics and leadership methods of studying in group dynamics such as group discussion, dialogue, Buzz session, brain storming seminar, symposium panel discussion, role playing, Hardle methods) recent researches in group dynamic process.

4. Adoption and diffusion of innovation.

Concept of adoption and diffusion, adoption process, stages, rate of adoption process, stages; rate of adoption, categories, and elements of adoption and diffusion. Innovation-meaning, characteristics, steps involved in introducing an innovation in a community.

Practical

1. Selection of leaders.
2. Visit to selected Government and Non-government organizations to study their extension and transfer of technology programmes / schemes and approaches.

DARD - 204 Value Education (Compulsory)

2+0

Personality development: -

1. Two selected Vedic mantras -- chanting and meaning
2. Five shlokas selected from the Gita and the Upanishads – chanting and meaning
3. Education: Concept and philosophy, education for the women, and education for the masses
4. Great Educators and their methods: Upanishadic Rishis, Booker T. Washington, R.N Tagore
5. Manifestation of: *Shradhha*: Satyakam, Aruni, Thomas Alva Edison, Jagadish Ch. Bose,
6. Education as the key: Swami Vivekananda
7. Essential moral virtues: Mercy and self sacrifice, service, duty, chastity, non-injury, attention to means. Morality--- its relative aspects, its absolute standard, utility of morality and ethics, Ethics--- the way and the method , Great Teachers of morality: Socrates, Abraham Lincon

8. I. Integral Personality Development:

Life and teachings of two / three great personalities (in short): -

(a) Life & teachings of Upamannu, Aruni, Sattakama, Nachikea, Dhruva, Prahlad, Abhimannu (Exemplary for truthfulness, Obedience, and discipline). (b) Upanisadic sages like Yagyavlkya (c) Sri Rama, Lord Krishna, Sri Ramakrishna, Swami Vivekananda, Sri Sarada Devi, Ramana Maharshi, (d) Emperor Ashoka, Mahatma Gandhi, Netaji Subhas Chandra Bose, Rana Pratap, Jhansi Rani Lakshmibai, Kshudiram; Birsha Munda and other local saints and heroes(if any).(e) Scientist like Albert Einstein etc.

DARD - 205 Work Experience (6 weeks)

0+10
