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RAMAKRISHNA MISSION VIVEKANANDA EDUCATIONAL AND RESEARCH INSTITUTE (RKMVERI)

**Faculty Centre - Integrated Rural & Tribal Development and Management (IRTDM)
at
Ramakrishna Mission Ashrama
Morabadi, Ranchi, Jharkhand - 834008.**

SYLLABUS CUM

COURSE OUTLINE

FOR

**Integrated M. Sc. in 'Agriculture, Rural and Tribal Development (ARTD)'
(5 Year— Ten Semester—Course)**

(ACADEMIC YEAR COMMENCED FROM: 2006 - 2007)

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Five-year (Ten-Semester) Integrated M.Sc. course in ‘Agriculture, Rural and Tribal Development (ARTD)’ at Ramakrishna Mission Ashrama Divyayan Krishi Vigyan Kendra, Faculty Centre under Ramakrishna Mission Vivekananda University (Established under Section 3 of UGC Act,1956).

COURSE CONTENT FOR THE B.Sc (Hons.) DEGREE IN “ARTD”

[Previous title- COURSE CONTENT FOR THE B.Sc (Hons.) DEGREE IN “IRTDM”]

Note: In calculating the number of credits, the European Credit Transfer System (ECTS) has been followed, in which 1 Credit = 18 hours [both for theoretical (Th) and practical (Pr) classes]

SEMESTER - 1

Course No.	Course Title	Credits (Th+Pr)
IRTD-101	Genesis of Rural and Tribal Development	4 + 2 = 6
IRTD-102	Extension Education -I	3 + 0 = 3
IRTD-103	Basic Agriculture	4 + 4 = 8
IRTD-104	Rural and Tribal Society	3 + 2 = 5
IRTD-105	Integrated Aquaculture	2 + 2 = 4
IRTD-106	Panchayati Raj Institution	2 + 0 = 2
	Total	18 + 10 = 28
IRTD- 107	Communicative English	4 + 0 = 4

SEMESTER – 2

Course No.	Course Title	Credits (Th+Pr)
IRTD-201	Rural and Tribal Economy	3 + 2 = 5
IRTD-202	Commercial Agriculture	2 + 3 = 5
IRTD-203	Horticulture	3 + 4 = 7
IRTD-204	Extension Education -II	3 + 2 = 5
IRTD-205	Health and Nutrition	2 + 2 = 4
IRTD-206	Personality Development -I	3 + 0 = 3
	Total	16 +13 = 29
IRTD-207	Computer Application -I	1 + 2 = 3

SEMESTER – 3

Course No.	Course Title	Credits (Th+Pr)
IRTD-301	Rural and Tribal Women and Children	2 + 2 = 4
IRTD-302	Adult and Non-Formal Education	2 + 2 = 4
IRTD-303	Basic Environmental Science	3 + 3 = 6
IRTD-304	Farming System Approaches	2 + 3 = 5
IRTD-305	Crop Production Technology	4 + 3 = 7
IRTD-306	Personality Development -II	3 + 0 = 3
	Total	16 + 13 = 29
IRTD-307	Computer Application -II	1 + 2 = 3

SEMESTER – 4

Course No.	Course Title	Credits (Th+Pr)
IRTD-401	Development Communication	4 + 2 = 6
IRTD-402	Rural Development Administration	4 + 0 = 4
IRTD-403	Basic Animal Husbandry	3 + 3 = 6
IRTD-404	Organic Agriculture	3 + 4 = 7
IRTD-405	Rural Banking	3 + 0 = 3
IRTD-406	Personality Development- III	3 + 0 = 3
	Total	20 + 9 = 29

SEMESTER – 5

Course No.	Course Title	Credits (Th+Pr)
IRTD-501	Rural and Tribal Demography	3 + 2 = 5
IRTD-502	Agricultural Bio-technology	3 + 4 = 7
IRTD-503	Rural & Agricultural Marketing	3 + 2 = 5
IRTD-504	Entrepreneurship Development	3 + 2 = 5
IRTD-505	Research Methodology	3 + 2 = 5
IRTD-506	Personality Development - IV	2 + 0 = 2
	Total	17 +12=29

SEMESTER - 6

Course No.	Course Title	Credits (Th+Pr)
IRTD-601	Integrated Crop Management	3 + 2 = 5
IRTD-602	Rural Development: Planning and Management	2 + 2 = 4
IRTD-603	Personality Development - V	2 + 0 = 2
IRTD-604	Development of Non-Farm Sectors	3 + 2 = 5
IRTD-605	Project work	0+20
IRTD 606	Rural Living and Learning Experience (RLLE)- I	0+2
	Total	10 + 28 =38

SYNOPSIS OF THE SIX-SEMESTER COURSE IN 'ARTD' LEADING TO B.Sc. DEGREE

Semester No.	No. of courses	Credits (Th. + Pr)
Semester 1	6	18 + 10 = 28
Semester 2	6	16 + 13 = 29
Semester 3	6	16 + 13 = 29
Semester 4	6	20 + 9 = 29
Semester 5	6	17 + 12 = 29
Semester 6	5	10 + 28 = 38
Total	35	97 + 85 = 182

COURSE OUTLINE

Agriculture, Rural and Tribal Development (ARTD)

SEMESTER – I.

(As on 17/12/13)

IRTD 101: Genesis of Rural and Tribal Development (Credits 4+2=6)

Objectives:-

This paper helps the students to develop the

- 1) Concept of rural development and tribal development.
 - 2) Swami Vivekananda, Gandhiji and Rabindranath Tagore's philosophy of rural development.
 - 3) The issues and challenges of rural development with special reference to Jharkhand.
 - 4) Insights of different rural and tribal development programmes in India.
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1. Rural and Tribal Development- meaning, concept and definition:

15 hrs

Definition & Concept of development, Indicators of development, Elements of development, Definition of underdevelopment & Indicators of underdevelopment. Definition of rural development, components and avenues of rural development. Tribal development- basic concepts. Historical background of rural and tribal development. Rural development in pre and post independence era. Tribal development in pre and post independence era. Selective case studies related to rural and tribal development.

Rural Development - as a discipline, as a concept, as a method, as a Process, as a Strategy and as a Phenomenon.

2. Rural Development- Indian Thinkers

25 hrs

- 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.
- iii) Mahatma Gandhi's approach to rural and tribal development in India
 - a) Philosophies, importance of villages in India.
 - b) Gandhiji's idea on: village sanitations, village health, village diet, village education, village industries and agriculture, village self-government, village protection, women and the village, students and the villages.
 - c) Qualifications for a rural development worker (Members of Loka Sevak Sangha) for all round village service (integrated rural development)
 - d) Village swaraj- concept and goal.
 - e) Sevagram and Wardha plan- objectives, salient features of the plan, reasons for failure and experiences gathered.
- iv) Narada Concept of Rural Development

- 3. Panchasheel** **3 hrs**
Nehruvian policy of tribal development.
- 4. Rural development and tribal development- Approaches:** **4 hrs**
Governmental approach - planning, constitutional provisions etc.
Non-governmental approach – Qualitative approach, Quantitative approach.
Qualitative approach Vs Quantitative approach,
Participatory approach and Non-participatory approach,
Textual approach and Contextual approach.
- 5. Rural development in Jharkhand:** **4 hrs**
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.
- 6. Issues and challenges of rural and tribal development in Jharkhand.** **3 hrs**
Problem of Drinking water; Sanitation; health & hygiene.
Bonded labour; Indebtedness; Housing; Liquor & so on.

Practical:

1. Exposure visit to a village for the establishment of rapport.
2. Exposure visit to a State Agricultural University.
3. A case study on the beneficiaries of any rural development programmes.
4. Survey of a village to find out the major problems.
5. Exposure visit to any NGOs/Govt. agencies engaged in rural development activities.
6. Seminar on the overview of the module at the end of the semester.

Recommended Books: -

1. Ahmed, Momtaruddin. 2006 *Current status and future perspectives of rural development in the CIRDAP member countries*. CIRDAP, Dhaka, Bangladesh.
2. Cloke, Paul J. 2006 *Handbook of rural studies*. New Delhi, Sage publications India Pvt. Ltd.
3. Behera, M.C. 2006 *Globalising rural development: competing paradigms and emerging trends*. New Delhi, Sage publications India Pvt. Ltd.
4. Bhowmik, Pradip K. 2005 *Tribal and sustainable development*. New Delhi, Kalpaz Publications.
5. Narasaiah, M Lakshmi. 2003 *Approaches to rural development*. New Delhi, Manohar Publishers.
6. Reddy, G Raghava. 2003 *Dynamics of sustainable rural development*. New Delhi, Manohar Publishers.
7. Singh, S.P. 2003 *Planning and management for rural development*. New Delhi, Manohar Publishers.
8. Govind, C Mondal. *Rural development-retrospect and prospect*. New Delhi, Concept publishers.
9. Verma, S.B. 2005 *Rural management*. New Delhi, Deep and Deep Publications Pvt. Ltd.
10. Singh, Surat and Singh, Mohinder. 2006 *Rural development administration in 21st century*. New Delhi, Deep and Deep Publications Pvt. Ltd.
11. Bhowmik, Pradip K. 2005 *Tribal and sustainable development*. New Delhi, Kalpaz Publications.
12. Rath, Govinda Chandra. 2006 *Tribal development in India- The contemporary debate*. New Delhi, Sage publications India Pvt. Ltd.
13. Verma, S. B, Jiloka, S. K, and Thryambakam, P. 2006 *Rural tourism and tribal development*. New Delhi, Deep and Deep Publications Pvt. Ltd.
14. Upadhyay and Pandey. *Tribal development in India- A critical approach*. Crown Publishers.
15. Bhatt, Anit. *Poverty, tribals and development*. Rediff Books.
16. NIRD. *Rural development in India- Some facts*. Hyderabad, NIRD Publication.
17. Ahmed, M Shakeel. 2004 *Five decades of planning and tribal development- A study of Uttaranchal and Jharkhand*. Gyan publishing house.
18. Swami Vivekananda's vision of rural development- Swami Prabhananda Ramakrishna Mission Lokoshikshaparisad, Narendrapur.

19. Palliprakiy of Rabindranath Tagore(Bengali),
 20) Rural Development in modern India – Kishore Chandra Padhy, B.R.Publishing Corporation,New Delhi-100052,Page-36 to 40.
 21. Rebuilding our villages – M K Gandhi, Navajivan Publishing Houses
 22. Industrialisation through poverty or poverty through industrialisation- A presentation on behalf of the Gandhians of Sevagram,1989. Page-1-28.

IRTD 102: Extension Education -I (Credits 3+0)

Objectives:-

This paper helps the students to delve deep into the

- 1) Concept, philosophy and principles of extension education.
- 2) System of extension education in India.
- 3) Different TOT models and delivery system.
- 4) Selected extension system of other countries.

1. Extension education-concept, principles and scope. 20 hrs

i)What is Extension Education? Extension Education–its meaning, ii) Concept & Nature of Extension Education. Objectives, principles and philosophy of Extension Education

2. System of extension in India. 10 hrs

Early extension efforts, community development programmes; ICAR extension system, extension systems of ministries, agricultural universities, KVK, TTCs, T & V, Development work by NGOs, government – NGO collaboration.

3. Technology-Meaning and concepts. 10 hrs

Appropriate technology, Transfer of Technology, system of transfer of technology –Knowledge Generating System (KGS), Knowledge Disseminating System (KDS), Knowledge Consuming System (KCS), Input Supplying Agencies System (ISAS). New communication strategy for transfer and adoption of agricultural technology.

4) Comparative analysis of extension systems of different selected countries. 14 hrs

USA, China, Japan, Israel, etc. strength and weaknesses of different extension systems.

Recommended Books: -

1. *Extension communication and Management – G.L. Ray, Kalyani Publishers.*
2. *Education and communication for development – Dahama & Bhatnagar, Oxford & IBH.*

IRTD – 103 :- Basic Agriculture (Credits 4 + 4)

Objectives:-

The paper familiarize the students on the

- 1) Basics of Agricultural Sciences.
 - 2) Identification & classification of crops.
 - 3) Concepts of nutrient management, weed management and water management.
 - 4) Overview of seed technology and farm implements.
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- 1. Concepts, definition and component of agriculture:** - Soils, Crops, Weather- **6 hrs**
 - (i) Definition of Agriculture;
 - (ii) Classification of Agriculture;
 - (iii) Concepts of Agriculture;
 - (iv) Components of Agriculture.
- 2. Climate:-**(i) Physical features of climate; **7 hrs**
 - (ii) 15- Agro-Climatic Zones of India (with map).
 - (iii) Season: - Kharif, Rabi and Zaid.
- 3. Soil: -** (i) Nutrient composition; (iv) Soil water; **8 hrs**
 - (ii) Soil structure and texture;
 - (iii) Soil characteristics;
 - (v) Acid and Alkaline soils;
 - (vi) Soils of Jharkhand.
- 4. (a) Seasonal classification of Crops:-** **6 hrs**
 - (i) Kharif crops; (ii) Rabi crops; (iii) Zaid crops.
 - (b) General Classification of crops:- Cereals, pulses, millets etc. & their differences.
- 5. (i) Cropping system** (like mono-cropping, sequence-cropping etc.) – definition with examples. **10 hrs**
 - (ii) **Cropping pattern** - definition with examples. and
 - (iii) **Crop rotation** - definition, Principles of crop rotation & its advantages.
- 6. Seed technology:** - (i) What is Seed? Different stages of a seed. **8 hrs**
 - (ii) What is quality seed?
 - (iii) Classification of seeds (i.e. Nucleus, Breeder, Foundation, and Certified seed), definition, & charectestics.
 - (iv) Importance of improved seed
 - (v) Principles and techniques of seed production.
 - (vi) Seed processing – Steps only.
- 7. Integrated Weed Management:** **12 hrs**

Weed definition, classification, harmful and beneficial effects of weeds, crop specific weeds, weed control methods including their advantages and dis-advantages, herbicide and their classification.
- 8. Basic concepts of plant protection:** Plant diseases and Insects pests identification, symptoms and control. **15 hrs**

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 from various sources of:

- (i) Manures and fertilizers
- (ii) Fungicides
- (iii) Insecticides *etc.*
- (iv) Bio - fungicides
- (v) Bio – pesticides

3. Identification and use of farm implements: -

To draw the figures mentioning different parts of agricultural implements in practical note-book with following information.

- (i) **Difference** and **use** of country plough and mould board plough
 - (ii) Identification of sprayers and its usage
 - (iii) Zero tillage machines
 - (iv) Land leveler machine & other modern implements.etc.
4. Identification of different weeds and preparation of weed herbarium.
 5. Identification of some common weedicides along with their dose calculation from their commercial formulations.
 6. Identification of green manure and green leaf manuring crops.
 7. Working at organic plots.
 8. Seminar on the overview of the module at the end of the semester.

Recommended Books: -

1. Principles of Agronomy – Dr T.Y.Reddy & Dr G.h .S. Reddy (Kalyani Publishers)
2. Text Book of Applied Entomology – K.P. Srivastava (Kalyani Publishers)
3. Seed Science and Technology – Sen & Ghosh (Kalyani Publishers)
4. Weed Management – Dr O.P. Gupta (Agrobios - India)
5. Hand Book of Agriculture – ICAR Publication
6. Plant Diseases – R. S. Singh – Oxford & IBH
7. Fundamentals of Soil – V. N. Sahai (Kalyani Publishers)

IRTD 104: Rural and Tribal Society (Credits 3+2=5).

Objectives:-

The module offers

- 1) An introduction to the rural and tribal social structure in India.
 - 2) The students about the ways in which rural people cope with life.
 - 3) The process and outcome related to rural change.
 - 4) Understanding of customs and institutional linkage with development.
-

1. Rural and Tribal Society:

32hrs

Concepts- Society, Community, Association, Social groups, Social structure, Social organization, Social Institutions, Social Interaction, Social Extension and Intensification, Social function, Social facts.

Rural and tribal community- Definition and features.

Social stratification- Caste and Class, Power, Prestige and Wealth, Theories on Social Stratification, Age, Sex. Ethnicity, Racism.

Religion- Definition, Functions of religion, Science vs Religion,

Magic- Black and White magic, Sympathetic and Homoeopathic magic,

Religion vs Magic Animism, Animatism, Manaism, Bongaism, Shamanism, Witchcraft, Sorcery, Totem, Taboo, Cult etc.

Culture- Definition, Aspects of culture, Functions of culture, Transmission of culture.

Caste- Definition, Features of caste system, Caste vs Tribe, Stratification vs Hierarchy, Rank society, Varna and Jati, Interdependence of Caste (Jajmani system).

Norms and Values, Status- Ascribed status and Achieved status, Role.

2. Family and Socialization:

14 hrs

Family- Definition, Functions of family, historical background, universality of family, Types of family- Based on structure, inheritance, marriage, authority etc. Disintegration of joint family, Socialization process.

Socialization- Role of family, community, peer group, gender differences.

Social Change- Sanskritization, Brahminisation, Westernization, Urbanisation, Economic development and Social Change.

Tribal social institution- Traditional panchayat, tribal dormitory, age-set system, tribal law and order, sanction.

3. Cultural and Social Change :

8 hrs

Meaning and definition of cultural and social change, Cultural change vs Social change.

Factors of cultural and social change.

Process of culture change- Acculturation, Assimilation, Syncretism, Transculturation, Integration, Innovation, Diffusion etc..

Each processes of cultural change with special reference to Chotanagpur tribals.

Practical:

1. Conducting socio-economic surveys in the village (Guideline) -- 3 to 4 days (Minimum)

a) Detailed description of the area under study covering history of the area, land types (local term), climate, flora, fauna etc.

b) **Village description**- Village history, Village map (Not to scale), settlement pattern, house type, communication system (both physical and cultural), religious places, land types, flora and fauna, cultivated resources, water sources, health centers, sanitation.

c) **Population analysis** – Age and sex, Sex ratio, Family type, Family composition, Family size, Marital status, Age at marriage, Marriage distance, Principal source of income, labor and non-labor force, working

force of the village, Sex-wise classification of work force, size of the economic unit, size of consumption unit.

d) Economic Life – Principal and subsidiary economy of the village. Process of cultivation – starting from the preparation of land to harvesting of crops, rotation of crops process of consumption, marketing of crops, mode of transactions cultivation associated rituals/ religious practices. Gender issues related to economic life.

e) Social Life – Birth, Marriage and Death

f) Conclusion (Developmental activities in the village)

2. Identification of social changes in the villages.

3. Seminar on the overview of the module at the end of the semester.

Recommended Books: -

1. Vidya Bhushan and Sachdeva. *An Introduction to sociology*. Kitab Mahal.
2. Banerjee, H.N. *Introducing social-cultural anthropology*. K.K.Publications
3. Doshi, S.L and Jain. *Social Anthropology*. Jaipur, Rawat Publications
4. Ember and Ember. *Cultural Anthropology*. Penguin Books.
- 5 Srinivas, M. N. 1962 *Caste in modern India and other essays*. Bombay: Asia publishing house.
- 6 Vidyarthi, L.P. 1964 *Cultural contour of tribal bihar*. Calcutta, Punthi Pustak.
7. Vidyarthi, L.P. 1976 *Tribal culture of India*. New Delhi, Concept publishing company.
8. Singh, K.S. 1972 *Tribal situation in India*. Kolkata, Anthropological Survey of India.
9. Bose, N.K. 1967 *Culture and Society in India*. Bombay, Asia publishing house.
10. Collins, Randall. 1997 *Theoretical Sociology*. Jaipur, Rawat publications.
11. Ritzer, George. 1997 *Post-modern social theory*. New York, The Mcgraw hill co.
12. Beattie, John. 1964 *Other cultures*. London, Cohen and west.
13. Majumdar, D.N and Madan, T.N. 1957 *An introduction to social anthropology*. Bombay, Asia publishing house.
14. Eriksen, T.H. 1995 *Small places, large Issues*. London, Pluto press.
15. Karve, Iravati. 1968 *Kinship organization in India*. Bombay, Asia publishing house.
16. Frazer, James. 1974 *The goldenbough (abridged edition)*. London, Macmillan.
17. Singh, K.S. 1985 *Tribal society in India*. New Delhi, Manohar publishers.
18. Ghurye, G.S. 1943 *The Scheduled tribes*. Bombay, Popular prakashan.
19. Jain, P.C. 1999 *Planned development among the tribals*. Jaipur, Rawat publications.

IRTD 105: Integrated Aquaculture :- (Credits 2 + 2=4)

Objectives: - To familiarize the students with

- 1) The basics & fundamentals of aquaculture.
- 2) Integrated aquaculture, pond and feed management.
- 3) Wastewater aquaculture and cultivation of aquatic macrophytes.
- 4) Constraints of aquaculture.

1. Fundamentals of Aquaculture: -

4hrs

- i) Meaning, definition and components of aquaculture, (including classification)
- ii) Scope of integrated aquaculture
- iii) Principles of organic recycling.
- iv) Relation of aquaculture in detritus food chain – its benefits and constraints.

- 2. Integration of crop, livestock and fish farming as complementary activities.** **4hrs**
 Concept, Principle, Scope, Economics and Benefits of crop, livestock and fish farming as complementary activities.
- 3. Use of agro-industrial waste and bio-fertilizer in aquaculture.** **4hrs**
 i) Concept for using agro-industrial waste and bio-fertilizer in aquaculture.
 ii) Management techniques for using agro-industrial waste and bio-fertilizer in aquaculture.
 iii) Benefits, constraints and economics for using agro-industrial waste and bio-fertilizer in aquaculture.
- 4. Wastewater aquaculture: paddy- cum-fish culture, duck-cum-fish culture, pig/poultry-cum-fish culture.** **10hrs**
 i) **Wastewater aquaculture-** preparation of pond & recycling of wastewater, stock density and ratio, supplementary feeding, precautions, harvesting & economics
 ii) **Paddy- cum-fish culture** –Preparation of field for paddy – cum – fish farming, stock density and ratio, supplementary feeding, precautions, harvesting & economics
 iii) **Duck-cum-fish farming** – Duck husbandry practices, selection of duck & fish varieties ,density etc .,harvesting and economics.
 iv) **Pig/poultry-cum-fish culture** – Benefits, pond preparation, pig\poultry management.
- 5. Cultivation of aquatic macrophytes (makhana and singhara) with fish.** **10hrs**
 i)Preparation of pond for aquatic macrophytes (makhana and singhara) with fish.
 ii) Stock density and ratio, supplementary feeding, for aquatic macrophytes (makhana and singhara) with fish.
 iii) Benefits for aquatic macrophytes (makhana and singhara) with fish.
 iv) Precautions, harvesting & economics.
- 6. Constraints of integrated aquaculture.** **4hrs**
 i) Technical constraints of integrated aquaculture
 ii) Economical constraints of integrated aquaculture.

Practical: (IRTD-105)

- i) Identification of common fishes and Morphological characteristics
 ii) Analysis of pond water for determining (a) Pond water pH test, (b) Dissolved oxygen, (c) Zooplankton and phytoplankton. (d) organic Carbon, (e) Nitrogen, Nitrite & total hardness of water.
 iii) **Analysis of decomposition patterns of (a) Animal waste & (b) Agro-residuals**
 iv) **Nutrient value of common animal wastes and agro-residues as potential manures.**
 v) **Economic analysis of integrated aquaculture practices.**
 vi) **Pathological and microbiological examination of fish in integrated aquaculture**
 vii) Commercial and farmer's approaches towards integrated aquaculture.
 viii) Seminar on the overview of the module at the end of the semester.

Recommended books:

- i) **Agro's Dictionary of Aquaculture – Dr P.K.Ghosh (Agrobios – India).**
 ii) **Applied Fisheries –Shammi &Bhatnagar (Agrobios – India).**
 iii) **Manual on Aquaculture –Dr A.K.Singh (BAU-publication)**
 iv) **Fishes Science and Indian fishes, Srivastava, C.B.L, Kitab Mahal.**
 v) **Fishes--Chandy, Mary.- National book trust.**

IRTD106: Panchyati Raj Institution (Credit 2+0)

Objectives:-

The students would get insights into

- 1) The PRIs and its functioning.
- 2) The broader constitutional and legal framework of PRIs.
- 3) Relation of PRI with bodies of civil society, NGOs and community based organization.
- 4) The different developmental programmes implemented through PRIs.

- 1. Emergence of the concept and evolution of the local self-government in India. 4hrs**
 - 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 4hrs**
 - 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. 2hrs**
- 4. Three – tier system: village panchayat, block committee and district board. 4hrs**

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. 5hrs**
 - 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. 2hrs**
- 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. 2hrs**
- 8. Development Programmes of the Ministries of the Union government and the State Government being implemented through PRIs. :**
 - 8.1 Agriculture 1hrs
 - 8.2 Cooperative 1hrs
 - 8.3 Animal Husbandry 1hrs
 - 8.4 Minor irrigation and irrigation 1hrs
 - 8.5 Health and Family Planning like National Rural Health Mission 4hrs
 - 8.6 HRD including Education, Women and Child Development like Mid-Day Meal Scheme 4hrs
 - 8.7 Industries – S.S.I., Food Processing industries and Handicrafts 3hrs
 - 8.8 Rural Development Programmes including Poverty alleviation Programmes, Watershed Management, (HAREYALI), Social Sector Programmes like SGSY, Indira Awas Yagna, Credit cum Subsidy Scheme, Pradhan Mantra Gram Sadak Yagna, Accelerated Rural Water Supply Programme, etc. Food security programmes including PDS, Antyodaya Anna Yagna, Annapurna Yagna, Hareyali, NREG Act of parliament 8hrs
- 9. Financing of the PRIs – own funds, sharing of the state income and grants in aids, panchayats, tax and non-tax Revenues. Classification of the financing resources of PRIs. 4hrs**
- 10. Constraints and Measures to strengthen PRIs. 4hrs**
 - i)Constraints & Ashok Mehta Committee report , (ii)Suggestions for improving PRIs

Note: Seminar on the overview of the module at the end of the semester.

Recommended Books: -

1. *Gram Panchyat Organisation : Effective Management for rural Development*
G.L.Ray And Sagar Mandal (Naya Prokash)
 2. *50 Years of Panchyati Raj and Rural Development- Singh & Pandey(Oscar Publication)*
 3. *Rural Sociology – Sharma (Atlantic Publication)*
 4. *Rural Development in India – Some facts (NIRD Publication).*
 5. *Extension Communication & Management – Prof G. L.Ray (Kalyani/ Naya Publication)*
 6. *Introduction to Panchayati Raj and Community development in India – Das & Harihara (Kalyani Publication)*
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Add on course for 6 months
IRTD-107: Communicative English (4 + 0)

SEMESTER II

IRTD 201: Rural and Tribal Economy (Credit 3+2 = 5)

Objectives:-

The student will be equipped with

- 1) The different aspects of rural and tribal economy and its relation with the development.
 - 2) The theoretical concepts of small scale economy and its functioning.
 - 3) Relation between poverty and development.
 - 4) The concept of agricultural production systems, unemployment, agricultural labor, SHG, Agricultural finance and indebtedness, rural industries etc.
 - 5) The functioning and problems of each aspect in the micro-level through practical exercises.
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1. Rural and Tribal Economy – Concept and Approaches

12 hrs

Definition, Nature, Features, size and structure of Indian rural economy difference with market economy, some theoretical concepts- Karl Marx, Max Weber, Emile Durkheim, Polanyi and Dalton. Economic system of simple societies- Production, Consumption, Distribution and Redistribution. Forms of simple economic exchange- Barter system, Silent trade, Jajmani system, Ceremonial exchange, *Haat*, Market system. Concept of property- Definition, General characteristics, Types of property (Movable, Immovable, tangible and intangible, private and public/communal), Ownership, types of ownership.

2. Interaction between Man and Nature

8 hrs

Relation between Man and Water. Role of water resources in economic development, watershed.

Relation between Man and Land- Types of land in Jharkhand, land use planning, land related problems, laws governing safety and protection of tribal land.

Relation between Man and Forest – Forest policy and forest dwellers, rights of the forest dwelling tribes, forest products and rural industry, forest and tribal economy, Impact of afforestation and deforestation on rural and tribal people, Joint forest management.

3. Rural poverty and development dimension.

6 hrs

Concept and measurement, facts and figures in India with special reference to Jharkhand, theoretical views on the causes of poverty- developmentalist view, Neoliberal view Poverty, growth and inequality interrelationship, concepts of human capital and poverty syndrome, rural vs. urban poverty, underlying factors of rural poverty. Policies for reducing rural poverty- Land reform, Rural public works programme, Access to credit, Physical and social infrastructure, production and transfer of agro-technology, food subsidy etc.

4. Rural Unemployment and Livelihood

8 hrs

- Definition, causes, types of unemployment- frictional, structural, cyclical, open, agricultural, Seasonal, underemployment, disguised underemployment, hidden underemployment. Unemployment in rural and urban areas, measurement of the rate of unemployment, unemployment status in rural India, Govt. policy towards removing unemployment. Livelihood Approach- Definition, historical background, components, guiding principles, framework, Applications.

5. Agricultural labour –issues and problems

6 hrs

Definition, Characteristics of agricultural labor in India, Classification of agricultural Laborers, Brief concept of Bonded Labor, Growth of agricultural labor in India, Causes of growth of agricultural labour in India, Governmental measures, suggestions for the improvement of agricultural labors.

6. Agricultural Finance and Rural Indebtedness

8 hrs

Extent and causes in India, Consequences, rural finance, classification of credit-development credit, production equipment credit, marketing credit, types and time period of loans, sources of rural finance, relationships between credit and rural development. Importance, problems and source-Govt. and Non Govt. – measures- and local

Definition, Main functions of SHG, types of SHG members, indicators of a good SHG, importance of training in the success of SHG strategy, quorum of SHG meeting, linkages of SHG with banks, Evaluation of SHG, purpose of internal loan.

7. Small scale and cottage industries- Importance, problems and policy measures –

4hrs

Definition of industry, types of industry- Heavy, Medium and Small scale industry. Types of SSI- Formal sector (tiny industry, cottage industry, household industry, artisan or handicrafts), Informal sector- village industry, rural industry, Importance, problems and policy measures.

8. Development Strategy - Centralisation vs. Decentralisation; Euro-centric vs. Eco-centric.

2 hrs

Practical:

1. To identify the causes of rural unemployment through survey in villages.
2. Measurement of farm holdings with special reference to land situation and study of land ownership pattern.
3. To study a functional SHG to understand method and procedure, record-keeping, linkages and income generating activities.
4. To study a small-scale cottage industry in the village.
5. Seminar on policy, plan and programmes of central and state govt. related to the module.
6. Seminar on the overview of the module at the end of the semester.

Recommended Books: -

1. *Agricultural Economics.*-By S. Subba Reddy, P. Raghu Rai, T.V. N. Sashtry, Bhawani Devi. Pub-Oxford.
2. *Fundamentals of Farm Business Management.* By-Joshi & Kapoor. Pub- Kalyani
3. *Rural Development in India – Some Facts.* NIRD Publication,Hyderabad.
4. *Plannig for Integrated Rural Devlopment.*- Maithani, B. P.—NIRD Pub.
5. *Poverty And Unemployment.*—V. M. Dadekar.- Saga Pub. New Delhi.
6. *Rural Development and Rural Economy-* Jitendra L. Garmora. Jaipur, Vital Pub., 2007,
7. *Economic Development: Myth and Reality-*Man Chand Khandela. Jaipur, Pointer Pub., 2007
8. *Role of Agriculture in Indian Economy/N.K. Sharma and Sarita Sharma.* Jaipur, RBSA Publishers, 2007
9. *Agricultural Credit: Sources, Problems and Emerging Issues/Balwinder Singh.*Delhi,Deep & Deep, 2000.
10. *Agricultural Labour in India/S.N. Tripathi.* New Delhi, Mohit, 2005,

11. *Agro-Based Industries : Problems and Prospects*-G.V. Joshi. New Delhi, Mohit, 2002,
12. *Economic Development and Structural Change in Rural India*-B.S. Gulshetty. N. Delhi, Classical, 2003,
13. *Economic Planning and Development*-B.L. Mathur. Jaipur, Sublime Pub., 2002
14. *Rural Economy*-A.C. Mittal. Delhi, Vista International Pub., 2006
15. *Rural Industrialization and Infrastructure*/Vivek Saurath. New Delhi, Dominant Pub., 2003
16. *Rural Industries in India*/M. Soundarapandian. New Delhi, 1999,

IRTD 202: Commercial Agriculture (Credit 2+3=5).

Objectives:-

To familiarize the students with the basics of

- 1) Both traditional and modern beekeeping including rearing techniques care and management.
- 2) Identification, cultivation and marketing of Lac.
- 3) Identification, cultivation and marketing of Tasar and silk worm.
- 4) Mushroom cultivation including processing and marketing.

1. Bee-keeping:

14 hrs

1.1 Detailed study of honey bee, its various species and their habits:

[Introduction, Importance of bee keeping, life history, different species & their habits]

1.2 Rearing techniques of honey bee,

1.3 Difference between traditional and modern bee keeping.

1.4 Care and management of bee hive, disease, pest & control measures; bee hive products and their utility i.e.(i) honey & its uses as food, medicine, other uses. (ii) bee wax, (iii) Propolis, (iv) Royal jelly, (v) pollen.

1.5 Economics of bee keeping.

2. Lac Culture, Tasar culture and Sericulture:

14 hrs

2.1 Importance of lac Cultivation, its species, management of pests & diseases of lac insects.

2.2 Marketing of lac.

2.3 Different species of tasar and silk worms.

2.4 Management of pests and diseases of tasar and silk worms.

2.5 Cultivation of host plants of tasar and mulberry.

3. Mushroom Cultivation:

8 hrs

3.1 Morphology and life-cycle. Study about different types of mushrooms.

3.2 Importance of mushroom as a health food, cash crop and eco- friendly commodity.

3.3 Wild and cultivated mushroom, edible and poisonous types, tropical and temperate species.

3.4 Mushroom spawns media and substrate for different species.

3.5 Cultivation of Oyster mushroom, their harvest and marketing. Study of cultivation process, harvest and marketing of button mushroom, milky mushroom, paddy straw mushroom

3.5 Production technology and post-harvest handling of fresh and processed products and their marketing.

Practical:

1. Bee-keeping:

1.1 Identification and use of commonly used equipments in bee keeping.

1.2 Identification of queen, drone and worker cells.

1.3 Occupants of bee colony and the role of individual.

1.4 Record of management and production of honey

1.5 Farmer's approach and Commercial approach of beekeeping

2. Lac Culture, Tasar culture and Sericulture:

- 2.1 Identification and description of various host plants of lac, tasar and sericulture.
- 2.2 Rearing of lac, tasar and silk worm and cocoon maintenance.
- 2.3 Lac, tasar and sericulture from farmer's and commercial approaches.
3. Mushroom Cultivation:
 - 3.1 Pure culture of mushroom---preparation and maintenance
 - 3.2 Spawn- media preparation, inoculation and incubation.
 - 3.3 Substrate formulations, composting and pasteurization.
 - 3.4 Spawning, casing and maintenance of optimum.
 - 3.5 Cultural conditions, hygiene and management of pest and diseases.
 - 3.6 Harvesting, processing and value addition.
 - 3.7 Farmer's and commercial approaches of mushroom cultivation.
4. Seminar on policy, plan and programmes of central and state govt. related to the module.
5. Seminar on the overview of the module at the end of the semester.

Recommended Books: -

1. *Biotechnology: B D Singh, Kalyani Publishers*
2. *Text book of Mycology : Dr. A K Sarbhoy, ICAR Publication*
3. *Recent Advances in the cultivation Technology of edible mushrooms : R.N. Verma and B.Vijay*
4. *Textbook of Applied Zoology, Vermiculture, Sericulture, Lac-Culture, Agriculture Pests and their Controls- Jabde, Pradip V. Saujanya Books.*
5. *Beekeeping : A Guide to better understanding of Bees. Carter, George A. Saujanya Books.*
6. *Perspectives in Indian Apiculture Mishra R.C. AgroBios*

IRTD 203: Horticulture (Credits 3+4 =7)

Objectives:-

To familiarize the students with the basics of-

- 1) The different branches of horticulture like *olericulture, pomology, floriculture* etc.
- 2) Preservation techniques and value addition of fruits and vegetables.
- 3) Orchard management, planting and propagation techniques.
- 4) Cultivation techniques for medicinal and aromatic plants *etc.*

1. Production technology of different vegetables in India	10 hrs
Olericulture definition, importance and scope of olericulture, classification of vegetables, cultivation of some important seasonal vegetables.	
2. Production technology of different fruits in India	10 hrs
Pomology definition, importance, fruits classification, different tropical and sub-tropical fruits production technology.	
3. Orchard Management practices.	6 hrs
Orchard planning and lay out, systems of fruit planting, training and pruning systems along with their objectives, fertilization and after care operations <i>etc.</i>	
4. Preservation, Processing and marketing of horticultural crops.	8 hrs
Importance and scope of processing, processing and preservation techniques, heat preservation, cold temperature processing and preservation, preservation by removing moisture, marketing of different horticultural crops.	
5. Cultivation techniques for different commercial flowers including orchids.	6 hrs
Cultivation techniques for different commercial flowering annuals, orchids-classification, growing media, cultivation techniques <i>etc.</i>	

6. Landscape Gardening. **5 hrs**

Floriculture-prospect and scope for India, hedge plants and their qualities, edge, lawn definition, establishment and their maintenance, *etc.*

7. Cultivation techniques for important medicinal and aromatic plants. **5 hrs**

Scope and importance, common name, botanical name of different medicinal plants along with their parts used, chief medicinal and aromatic compositions present in medicinal and aromatic plants, GAP for important medicinal and aromatic plants.

8. Propagation and nursery Management. **4 hrs**

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. Improved nursery bed for raising flowers and vegetables.
- 2. Planning and layout of kitchen garden.**
- 3. Planning and layout of commercial orchard.**
4. Identification of medicinal and aromatic plants along with their uses.
5. Identification of important herbs, shrubs, climbers and pot plants.
6. Curing of rhizome, bulbs and corms of different horticultural crops.
7. Preparation of pit for planting fruit trees.
8. Special agro-techniques for growing different horticultural crops.
9. Training and pruning techniques in flower and fruit trees.
10. Preparation of pickles, chips etc.
11. Seminar on policy, plan and programmes of central and state govt. related to the module.
12. Seminar on the overview of the module at the end of the semester.

Recommended Books: -

- i) Handbook of Horticulture, ICAR Publications
 - ii) Propagation of Tropical & Sub-tropical Horticultural Crops – T. K. Bose
 - iii) Introductory Ornamental Horticulture – J.S. Arora, Kalyani Publications
 - iv) A Text book of Pomology – T. K. Chattopadhyay (Vol. – I- IV), Kalyani Publishers.
 - v) Varieties of Vegetable Crops in India – Hazra & Banerjee, Kalyani Publishers.
 - vi) Plant propagation at a glance – R. G. Maiti, Kalyani Publishers.
 - vii) Floriculture at a glance – Raj, Kalyani Publishers.
 - viii) Principles of fruit preservation. - T. N. Morris, AgroBios.
 - ix) Principles of Horticulture – Prasad & Kumar, Agrobios.
 - x) Handbook of medicinal & Aromatic plant- BCKV Publication.
 - xi) Production Technology of Vegetable Crops-M. G. Som and P. Hazra-Kalyani Publishers.
 - xii) Processing and Preservation of Fruits and Vegetables-R. P. Srivastava-Kalyani Publishers.
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IRTD 204 Extension Education II (Credits 3+2 = 5)

Objectives:-

The course creates the awareness about

- 1) The concept and meaning of group and leadership.
- 2). The attitudinal and motivational theories.
- 3) adoption and diffusion of innovation

1. Group: Definition, characteristics and types group morale, group dynamics methods of group work principles and processes of involving people. **6 hrs**

2. Social Psychology. **28 hrs**

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 **10 hrs**

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. **10 hrs**

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.
3. Identifying farmers at different stages of adoption and accelerating the process with reference to the farm innovation in a village, locating farmers of different adopted categories by the students in a village and reporting the data collected etc.
 4. Seminar on policy, plan and programmes of central and state govt. related to the module.
 5. Seminar on the overview of the module at the end of the semester.

Recommended Books: -

1. *Extension communication and Management – G.L. Ray, Kalyani Publishers.*
2. *Education and communication for development – Dahama & Bhatnagar, Oxford & IBH.*
3. *Understanding Extension Education/Maimun Nisha. New Delhi, Kalpaz, 2006,*
4. *Terminology of Extension Education/P.M. Khan. Reprint. Udaipur, Agrotech Pub., 2005*
5. *Research Methodology in Extension Education/Pujari Daivadeenam. Udaipur, Agrotech, 2002,*
6. *Fundamentals of Extension Education and Management in Extension/K.A. Jalihal and V. Veerabhadraiah. New Delhi, Concept Pub., 2007*
7. *Agricultural Extension: Impact and Assessment/A.K. Singh. Reprint. Jodhpur, Agrobios, 2003*
8. *Personality Development: Modern Methods and Techniques/Harish M. Chandarana. Jaipur, Paradise Pub, 2007*
9. *Aspect of Rural Communication: A Study on the Ethnography of Communication of the Santals of Eastern India/Manas Ray. New Delhi, Serials, 2006*
10. *Communication and Social Change/Arun Bhatia. New Delhi, Akansha, 2005*
11. *Development Communication in Rural Sector/Debabrata Das Gupta, Sarthak Chowdhury and Siddhartha Dev Mukhopadhyay. Delhi, Abhijeet Pub., 2007*
12. *Development Communication and Information Economics in the New Millennium/Krishan Sondhi. Delhi, B.R., 2003.*
13. *Adult and Non-Formal Education : Second Revised and Enlarged Edition/Jagannath Mohanty. New Delhi, Deep & Deep, 2002.*
14. *Development of Adult, Continuing and Non-Formal Education in India/S.P. Agrawal, Mithilesh Gupta, M.W.K. Sherwani and Meena Usmani. New Delhi, Concept, 2002.*
15. *Motivation and Learning/M. Asch. New Delhi, IVY Pub., 2004.*
16. *The Motivation Handbook : Developing Practice/Sarah Hollyforde and Steve Whiddett. Mumbai, Jaico, 2005*
17. *Communication Through Farm Literature – Sawant Saujanya Books.*
18. *Agricultural Extension Manoharan ,P.Muthilah & Arunachalam, R. Saujanya Books.*

IRTD 205: Health and Nutrition: (Credit 2+2 = 4)

Objectives:-

The course creates the awareness about

- 1) The basic concepts of health and health related issues.
- 2) The role of health and nutrition professional in rural and tribal development.
- 3) The cultural and clinical dimensions of health.
- 4) The national programmes related to the eradication of water and sanitation problems.
- 5) The first-aid techniques for initial prevention.

1. Health

1.1 Basic concept of health ---

4 hrs

Concept of health, Definition, Signs of good health- Physical, Social, Mental, Interrelationships among them. Health vs illness, Impact of illness on family roles. Factors affecting health- Personal hygiene, exercise, rest and sleep, posture, home environment, eating habits, climate and clothing, safety measures at play and work influence of smoking, alcohol and drugs.

- 1.2 Dimensions of health:** -- physical, psychological, emotional and spiritual—their relationship—
 Knowledge, Attitude and Practice (**KAP**). **3 hrs**
 -Physical, social, mental, emotional, intellectual and spiritual—their relationship.
 -Health problems in India, Evolution of public healths. Knowledge Attitude and Practice (KAP)-
 Definition, importance, preparation of KAP questionnaire
- 1.3. History of Indian system of medicine viz. Ayurveda, Siddha, Surgery, Unani-Tib, Homeopathy etc** – Ayurvedic system, Siddha, Unani system, folk medicine, Home remedies, Yogic medicine, Tantric medicine, Allopathy, Homeopathy, Naturopathy etc. Cultural aspects of health and medicine, Traditional medicine system, Concept of health and disease in rural and tribal areas. **4hrs**
- 1.4. Different methods for prevention of diseases** - use of medicinal herbs / plants in rural areas, simple physical and breathing exercise, Acupressure , yoga and other techniques based on traditional knowledge and wisdom for sound health and sound mind . **4 hrs**
- 1.5. WHO's approach to deal with Rural Health and Sanitation**, Alma-Ata declaration, Primary Health Care (**PHC**), Immunization, Appropriate treatment against serious acute ailment such as diarrhoea, dehydration, health care for the vulnerable groups.- **3 hrs**
 Alma-Ata declaration, Primary Health Care (PHC), Immunization, Aims of epidemiological studies, epidemiological approach, epidemiological methods, Descriptive Epidemiology, Analytical Epidemiology, Experimental Epidemiology, epidemiology of communicable diseases- Malaria, Cholera, Tuberculosis, Hepatitis, Dengue, Small pox, Chicken pox, measles, Mumps, influenza, diphtheria, whooping cough, poliomyelitis, Health care and community.
- 1.6 Appropriate Health delivery system in rural area:** **4 hrs**
 - Central delivery system- Different organs, their structure and Function, state level organs, district level, Village level. Types of health care agencies. Health Planning in India, Health policy and five year plans, Health expenditure, health sector, health goals, health for all programme. NRHM. Family welfare aspects, Health infrastructure. Organisation and Functions of community health centres and primary health centres
- 1.7. Affordable treatment for common ailments and injuries, first aid etc.** **3hrs**
 [Basic concept of First Aid, how to handle the cases of burn & other injuries bites of dog/ snake / monkey/scorpion or other insects]
- 1.8. Behavior Change communication (BCC)-** what is BCC & what is communication & its types. **1hr**
- 2. Human Nutrition and Nutrition Education -** **4hrs**
 2.1. Socio-economic factors influencing health and nutrition.
 2.2. Basic requirement of nutrition for human body, Sources of calories, protein and fats for human body
 2.3. Nutritional value in different components of food available in rural areas, Knowledge of special nutritive value of some foods in rural areas.
 2.4. Maternal and Child Health (MCH) - Nutritional needs and other problems during pregnancy, care of newborn baby, care of preschool children .
- 3. Safe Drinking water-** **3hrs**
 3.1. Concept and need, strategies and principles for providing safe drinking water.
 3.2. Rural technology to get safe drinking water- Water purification techniques- local and industrial.
 3.3. Different schemes and programmes.
 3.4. Collect / harvest of rain or other good quality water.
- 5. Sanitation-** **3hrs**
 4.1. Personal hygiene and environmental hygiene— Concept of Personal hygiene and environmental hygiene with an example of a toto community, sanitation and health linkage.
 4.2. Different measures of sanitation
 4.3. Sanitation programme and implementation- Total sanitation campaign- Background and objectives, Components- Information Education and Communication (IEC), Rural Sanitary Mart (RSM), Rural Sanitary complex (RSC) etc.
 4.4. Use of night soil as compost in agriculture.
 4.5. Role of health worker.

Practical:

- 1.1 Practice of physical and breathing exercise, acupressure and yoga.
- 1.2 Identification and use of some commonly available medicinal plants.
- 1.3 First aid techniques for common injuries and accidents.-
- 1.4 Visit to a community health centre, primary health centre and sub centre.
- 1.5 Preparation of ORS
2. Preparation of a nutritional value chart for commonly available fruits and vegetables
- 3.1 Preparation of water filter using locally available materials
- 3.2 Use of lime, alum etc. to purify water
- 4.1 Construction of soak pit, garbage pit.
- 4.2 Visit and study of different components of low cost latrines and its construction
- 4.3 Preparation of posters and leaflets for awareness programme.
5. Medical data collection and make awareness through power point & audiovisual.
6. Seminar on policy, plan and programmes of central and state govt. related to the module.
7. Seminar on the overview of the module at the end of the semester.

Recommended Books: -

1. *Changing Trends in Health and Nutrition*-Sujata K. Dass, Delhi, Isha Books, 2004
 2. *Advances in Ayurvedic Medicine*/R.H. Singh. Varanasi, Chaukhambha Visvabharati, 2005.
 3. *Health by the People: Sociology of Medical Lore*/V. Sujatha. New Delhi, Rawat, 2003
 4. *Health of Primitive Tribes*/Robin D. Tribhuwan. New Delhi, Discovery Publishing House, 2004.
 5. *Encyclopedia of Health and Nutrition*/edited by Debashri Ray. New Delhi, Sarup & Sons, 2002,
 6. *Health and Development: Intersectoral Linkages in India*/K.V. Narayana. 1997
 7. *Health and Hygiene in Vedic Literature*/Nirmalendu Nath. Kolkata, R.N. Bhattacharya, 2006
 8. *Health and Nutrition*/edited by D.C. Lal. New Delhi, Sports Pub., 2006
 9. *Health and Nutritional Development of Women*/Maya Majumdar. New Delhi, Adhyayan Pub., 2006
 10. *Health Education: Theory and Practice*/S.L. Goel. New Delhi, Deep and Deep Pub., 2007
 11. *Tribal Health in India*/edited by Bhupinder Singh and Neeti Mahanti. 1995
 12. *Anthropology of Food and Nutrition*/S.L. Doshi. 1995
 13. *A Text Book of Nutrition* by Vidya & D.B. Rao Discovery Publishing House, New Delhi 1996
 14. *Reforms in Drinking Water and Sanitation*/Kaushik Deb. New Delhi, TERI Press, 2004
 15. *Water: A Matter of the Life and Health: Water Supply and Sanitation in Village India*/Maggie Black with Rupert Talbot. New Delhi, Oxford University Press, 2005
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IRTD 206: Personality Development - I (Credits 3 + 0 = 3)

I. Integral Personality Development:

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

1. (a) Life & teachings of Upamannu, Aruni, Sattakama, Nachikea, Dhruva, Prahlad, Abhimannu.
(Exemplary for truthfulness, Obedience, and discipline). (b) Upanisadic sages like Yagyavalkya
(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 Lakshmi Bai,
Kshudiram; Birsha Munda and other local saints and heroes(if any).
(e) Scientist like Albert Einstein etc.

II. Concept

1. Short study about life & teachings of Upamannu, and Aruni. -----2 hrs
2. Five Shanti mantras:- Chanting, and meaning with explanation.-----2 hrs.
3. 15 selected shlokas about immortalities of Atman from Gita & Upanishads -- chanting & meaning with explanation. From Gita-10 shlokas; from Upanishads- 5 shlokas.- -- 6 hrs.
- 4.(a) Awareness about hygiene, pollution etc.-----3 hrs
(b) Free hand exercises, Yogasana and health awareness.

- (c) The concept of pranas and simple pranayam.
5. Principles of concentration, Brahmacharya and shraddha.-----2 hrs
6. Time management to achieve higher goal.-----2 hrs.
7. Role of emotions in our lives.-----2 hrs
8. Common sense : work efficiency and into human relationship.-----2 hrs
9. Personality—An introduction; it is personality that matters; laws of personality-----9 hrs
in development; five levels of personality and ways to nourish each level towards
integrated personality development.
10. Life and teachings of Swami Vivekananda and Lord Buddha ;----- 10 hrs
- 11 **Quiz, Group Discussion, Seminar, Role playing etc**

Add on course: IRTD-207: Computer Application-I (Credit 1+ 2= 3)

SEMESTER III

IRTD 301: Rural & Tribal Women and Children: (Credits 2+2 = 4)

Objectives:

The students would be acquainted with

- 1) the concept and approaches of gender and related issues
- 2) the situational overview of the rural and tribal women of India.
- 3) the programmes and other activities related to women development.
- 4) the concept of child labour and the rights related to women and child.

- 1. Concept of Gender and its implication. 5 hrs**
Concept and meaning of gender, Difference between Sex and Gender, Importance of studies on Gender issues, Gender issues in rural and tribal society, Kinds of gender discrimination- paternalistic dominance, tool of sexuality and reproduction, state of unfreedom, economic oppression, stand by wife, issues related to marriage etc.
- 2. Activities and approaches to sensitize on gender issue 5 hrs**
Concept of gender equality, gender equality vs gender equity, rationale for gender equality, Gender mainstreaming, Empowerment of women, difference between empowerment and mainstreaming, gender role and gender division of labour, factors influencing division of labour, types of women's role- reproductive, productive and community management, Gender identity. Basic approaches of gender studies- biological, psychological and cultural.
- 3. Socio-cultural customs, beliefs affecting women's lives 3 hrs**
Ancient India, Medieval India – Sati, Jauhar, Child marriage, Pardah, Devadasi, Restriction on widow remarriage. etc
Modern India- Dowry, Female infanticide, Foeticide, Divorce, Maternal mortality, Poor health, Drudgery, educational inequality etc. Social indicators reflecting women status.
- 4. Women in Rural Development. 3 hrs**
Historical background, role of women in agricultural development, changing role of women due to Modernization, contribution in non-farm activities.

- 5. Health status of women and children.** **5 hrs**
 Causes of poor health status of rural women and children, principles to fight against poor health, dimensions of poor health, prevention of LBW Health status of pre-school children, Nourishment of the infants, Feeding of children of 3years onwards, Nutritional status of 3 – 6years children, Health status of tribal women.
- 6. Education and employment status of women** **2 hrs**
 Educational status of tribal women, Education and employment status of women, Women in organised sector, Employment status in non-agricultural activities.
- 7. Women and legal rights.** **4 hrs**
 Constitutional rights, Legal rights of women- Maternity benefit act, Provision of Creches, Working time, Insurance, Equalization of wages, Integrated development of training and employment, part-time employment, employment information, enforcement of laws protecting women workers
- 8. Govt. Programmes for rural women (ICDS, DWCRA, NSAP, SHG, Sahiya, Gram Sabha & other recently implemented programmes)** **5 hrs**
 ICDS- objectives, components and implementing agencies, impact of the programme. SAHIYA- Meaning, background, objectives, activities. Accredited Social Health Activist (ASHA) - Role of Sahiya. DWCRA- Background, objectives, principles, activities etc. NSAP- Background, objectives, principles, activities, Gram Sabha - Features, roles and responsibilities, key indicators of performance.
- 9. Children's status and child labour.** **4 hrs**
 Concept and definition of Child labour, difference between child labour and child work, Estimate of child labour in India and world. Types of hazards as per UNICEF- Physical hazard, Cognitive hazard Emotional, social & moral hazard. Extent of child labourers in India, Bonded child labour, Major sectors of child labours- Agriculture, Street work, glass factories, match factories, carpet industries etc. Definition of child rights, principles of Convention of the rights for the child (CRC)- Equality, Rights to survival and healthy development, participation, best interest of the child. Child labour laws- bonded labour abolition act, 1976, child labour prohibition and regulation act, 1986, ILO convention no. 182

Practical:

1. To study the sex ratio of some villages.
2. To study the health, education, and employment status of women.
3. To study about the awareness of rural women about legal rights & govt. development Programmes (ICDS, DWCRA, NSAP).
4. To study the health status of rural children and child labour.
5. Seminar on policy, plan and programmes of central and state govt. related to the module.
6. Seminar on the overview of the module at the end of the semester.

Reference books:

1. S.K. Ravikumar. 2006. *Indian Women: Status, Role and Empowerment*. Jaipur, Mangal Deep Pub.
2. Swati Sharma 2007 *Status of Women in India*. New Delhi, Pearl Books.
3. Usha Sharma 2006 *Child Labour in India (edited)*. New Delhi, Mittal Pub.
4. Nanjunda D.C 2008 *Child Labour and Human Rights: A Prospective*. Delhi, Kalpaz Pub.

IRTD 302: Adult & Non-formal Education: (Credits 2+2= 4)

Objectives:

This paper helps the students to understand the

- 1) Concept and principles of adult education.
 - 2) Objectives of NLM and the meaning of functional literacy.
 - 3) Programmes related to adult education and its method of evaluation.
 - 4) Teaching and learning methods of adult education.
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- 1. Concept and meaning of Adult & Non-formal Education. 2 hrs**
Definition of education, types of education- formal and non-formal education. Concept of continuing or adult education, difference from formal education.
- 2. Difference between andragogy and pedagogy 4 hrs**
Concept and definition of andragogy, principles of andragogy, andragogic model of adult education. Application of andragogy. Concept and definition of pedagogy, difference between andragogy and pedagogy, Knowles assumption of difference between andragogy and pedagogy
- 3. Brief History of Adult Education (A.E) -- influence of Paulo Freire Pre-Independence and Post Independence efforts in India,Adult Education Programme since 1978 and latest Development. 4hrs**
History of adult education, programmes of adult education before 1978- Gram sikshan mohim, Farmers functional literacy projects, components of the programme, workers education, adult education through voluntary agencies programme since 1978- National Adult Education Programme (NAEP)- Objectives, target, strength and weaknesses. Paulo Freire- A brief life history, Freirian principles of education- dialogue, praxis, bottom-up approach, live experience, secular education. Conceptual tool of Freire- Banking education, Culture circle, problem posing method.
- 4. Objective of National Literacy Mission (NLM), concept and meaning of functional literacy. 4 hrs**
Background information on NLM, Goals of NLM, meaning of functional literacy, qualitative and Quantitative aspect of functional literacy, principles to fulfil the objectives of NLM, literacy Campaign- Objective and coverage. Continuing education- meaning, principles, schemes- Continuing education centre (CEC), National Continuing education centre (NCEC), target of the schemes, activities, programmes under CEC
- 5. Relevance of literacy and present demographic situation of national literacy. 4 hrs**
Meaning of literacy, advantages of literacy- intellectual development, employment generation, social Development, physical development, mental development, character building, spiritual development, increase of self-confidence. Demographic scenario related to education in India.
- 6. Motivation in Adult and Non-formal Education Programme. Strength and weaknesses of the past Adult Education Programme, Key issue for the success of NLM. 2 hrs**
- 7. Adult Education and its role in rural development. 2 hrs**
Rural development through adult education, adult education and rural change, rural women and adult Education, UNESCO plan for rural development- spread of literacy, civic rights and duties, developing thinking power, eradicate superstition, optimum use of available resources etc.
- 8. Role of Voluntary Agencies in Adult Education Programme. 2 hrs**
Concept of voluntary agencies and its role in rural development.
- 9. Organizing and management of Adult Education (A.E) programmes, Training in Adult**

Education, Teaching and learning methods.**3 hrs**

Principles of organization and management of adult education programmes, Attributes of adult education training, Teaching methods- Scaffolding, Praxis, Constructivism, Spaced Lecture, Group work, Communications-Discussion, argumentation, inquiry teaching, Brainstorming, Dialogue

10. Curriculum development in Adult Education.**2 hrs**

Principles of curriculum development for adult education, factors affecting curriculum development.

11. Monitoring and evaluation of Adult Education programme, process and methods, self evaluation model.**3 hrs**

Concept of monitoring and evaluation, recommendation of Arun Ghosh committee on the process of evaluation- feedback, participatory approach, internal evaluation, sample design, external evaluation, measurement of learners achievement. Self evaluation- Concept and its implications- evaluation is learning, evaluation as social constructivism, evaluation is predominantly adult learning, Self evaluation is organisational learning, Self evaluation is best planned and organised as a learning process

12. SATAT SHIKSHA, Farmers School, NIOS (National Institute of Open School).**4 hrs**

SATAT SHIKSHA- Background, objectives, target groups, principles and achievements. NIOS- Features and flexibilities in age group, medium of instruction. Combination of vocational and academic subjects, programme courses and pathways. Farmers field School- Historical backdrop, features of rice IPM FFS, Characteristics of FFS approach- farmers as experts, field as primary learning material, extension workers as facilitator, integrated curriculum, local training calendar, regular group meetings, team building.

Practical:

1. Prepare a syllabus module for adult education centre and also a brief project proposal for its establishment.
2. To study the literacy percentage and on going adult and non-formal education programme in villages.
3. To study the impact of Ramakrishna Mission on non-formal education programme.
4. To study the functioning of schools under “Total Literacy Programme (*Sarva SikshaAbhiyan*)” and other government programmes like *Setu Vidyalaya*, Continuous education etc
5. Prepare an evaluation schedule and evaluate atleast two adult education centre. Find out its drawbacks and suggest suitable measures for their improvement.
6. Seminar on policy, plan and programmes of central and state govt. related to the module.
7. Seminar on the overview of the module at the end of the semester.

Reference books:

1. K.V. Singh. 2007. *Adult Education in India: Historical Perspective* (edited) by. Delhi, Vista International.
2. Rajender Singh Yadav. 2002. *Adult Education: Concept Theory & Practice*. Ambala Cantt., The Associated.
3. Ajoy Chatterjee. 2008. *Adult Education and Rural Development*. New Delhi, Commonwealth Pub.
4. S.R. Mohsini. 1993. *History of Adult Education in India*, Anmol, Delhi.

IRTD 303: Basic Environmental Science (Credit 3+3 = 6)

Objectives:

This paper helps the students to understand the

- 1) meaning, nature and scope of different types of natural resources.
 - 2) techniques for sustainable utilization of different resources.
 - 3) policies related to conservation and its related impacts.
 - 4) process of nurturing human resources and different aspects of disaster mitigation.
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1. Multidisciplinary nature of environmental studies

2 hrs

Definition, scope and importance, Need for public awareness.

2. Natural Resources :

12 hrs

Definition, meaning, nature and scope;

Renewable and non-renewable resources:

- a) Forest and wildlife resources : Types, Use and over-exploitation, deforestation, case studies; Timber extraction, mining, dams and their effects on forest and tribal people, forest conservation and management, joint forest management (JFM); Conservation and the use of wildlife resources.
- b) Water resources : Water use, Surface and underground water resources: over-utilization, floods, drought, conflicts over water, dams-benefits and problems.
- c) Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources : Concept, World food problems, changes caused by agriculture and overgrazing, modern agriculture and environmental problems: fertilizer-pesticide problems, water logging, salinity etc., case studies.
- e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources and their environmental impacts, Case studies.
- f) Land and soil resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification; Role of an individual in conservation of natural resources; equitable use of resources for sustainable lifestyles.

3. Ecosystems

10 hrs

Concept of an ecosystem structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids, introduction, types, characteristic features, structure and function of the following ecosystem :-

- a. Forest ecosystem, b. Grassland ecosystem, c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

4. Biodiversity and its conservation

5 hrs

Introduction – Definition : genetic, species and ecosystem diversity, biogeographical classification of India, value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values, biodiversity at global, National and local levels, India as a mega-diversity nation, hot-spots of biodiversity, threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts, endangered and endemic species of India, conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

5. Environmental Pollution

10 hrs

Definition; cause, effects and control measures of:-

- a. Air pollution, b. Water pollution, c. Soil pollution, d. Marine pollution, e. Noise pollution
- f. Thermal pollution, g. Nuclear hazards.

Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution, pollution case studies.

6. Social Issues and the Environment

6 hrs

From Unsustainable to Sustainable development; Urban problems related to energy; Water conservation, rain water harvesting, watershed management; Resettlement and rehabilitation of people; its problems and concerns. Case Studies.

Environmental ethics : Issues and possible solutions; Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.

Wasteland reclamation; Consumerism and waste products; Environment Protection Act.

Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.

7. Human Population and the Environment

4 hrs

Human Resource – Concept, Human Resource development; Population growth, variation among nations; Environment and human health; Population, environment and development; Human Rights; Case Studies.

8. Disaster Management

5 hrs

Causes, distribution, Impact of hazards, National policy on disaster management, Community-based disaster preparedness (CBDP) – concept and its implementation; Traditional disaster management practices; Risk assessment and vulnerability analysis; Disaster mitigation strategies;

Practical:

1. Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
2. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
3. Study of common plants, insects, birds.
4. Study of simple ecosystems-pond, river, hill slopes, etc.
5. Soil test and soil health card preparation (lab. method and farmers' field method)
6. Planting cover crop and contour trench to conserve soil moisture and check soil erosion.
7. Identification of rural resources by using different Participatory rural appraisal (PRA) tools/ questionnaire/ survey etc
 - a. Need assessment of skill development training of the village people
 - b. Nature of natural disaster occurred, frequency, effect on rural life, concept of rural people about its mitigation, existing system, desired system, gap and action to be taken, formation of a village level task force for disaster management
8. Stratification of land (topography) and its utilization.
9. Water resources, distribution and utilization (irrigation, fishery etc.), study of rain water harvesting structures (if possible)
10. Animal resources: Types, distribution and contribution to rural economy.
11. Study of village sanitation and scope of provision of low cost drinking water and sanitary latrines
12. Generation of environmental awareness among villagers (sanitation and health, afforestation/ joint forest management, Soil and water conservation, Organic farming and animal resource generation, Sharing traditional knowledge regarding health-care, agriculture etc, fruit trees and medicinal plants plantation, composting of household wastes, indoor pollution and low cost chullas etc.)
13. Seminar on policy, plan and programmes of central and state govt. related to the module.
14. Seminar on the overview of the module at the end of the semester.

Note: Placement to village(s) for the fulfilment of practical assignments.

Text books:

1. *A textbook of environmental studies by Erach Bharucha, University Press*
2. *A textbook of environmental studies by Asthana and Asthana, S.Chand Pubs.*

Reference books:

1. *Ecology and Environment by PD Sharma, Rastogi pubs.*
2. *Environmental Science by RT Wright, PHI Pubs.*
3. *Population, Environment and Development – Report of UN*
4. *Natural Hazard and Disaster Management – CBSE class XI text book*
5. *Handbook of disaster management by William L Waugh, Crest Publishing House*
6. *Natural disaster and environment by Visvajit Gupta, SS Pubs*
7. *Environment problems and solution by Asthana and Asthana, S.Chand Pubs.*
8. *The nature and properties of soil by NC Brady*

IRTD 304: Farming System Approaches. (Credits 2+3 = 5)

Objectives:

The students would be acquainted with

- 1) the meaning, nature and scope of farming systems approach.
- 2) the principles, issues and management practices in sustainable agriculture.
- 3) the techniques of data collection using PRA tools .
- 4) the application of PRA tools in the rural context.

1. Farming Systems approach in agriculture.**5hrs**

Definition: - Farming, System and farming system, Farming system research and development- its objectives. Commercial production system, Green revolution system production system and Complex Diverse and risk prone System (CDR). Integrated Farming System.

2. Dryland Agriculture - Concept and definition.**8 hrs**

Definition :-Dry, Dryland and rainfed farming; Dryland vs rainfed farming. Problems of crop production in dry farming. Classification of climate like Kopper's, Thronthwaite's etc. How to reduce evapo- transpiration loss – mulches, anti-transpirant, wind break etc. Plant mechanism to conserve moisture. Definition – water harvesting, water harvesting techniques. Definition – watershed, approaches to watershed management project

3. Need for crop diversification in India.**3hrs**

Crop, animal, system – organic, urban & semi- urban state-wise.

4. Classification of farm and issues related to land ownership.**2hrs****5. Sustainable Agriculture - Definition, Concept & Scope****4 hrs**

Difference between sustainable and modern agriculture. Management practices for sustainable agriculture. Organic farming – Definition, Principles, concept and debated issues. Precision farming- Definition, Principles, concept and debated issues.

6. PRA tools and Techniques.

14 hrs

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

Practical:

1. Study and analyse of components of different types of farming systems (local & others)
2. Study of Cropping Systems under different resources and situation
3. Study of rural development programmes undertaken by Ramakrishna Mission Ashama, Ranchi in agriculture and allied activities, health and sanitation, literacy etc. and submit an analytical report.
4. Seminar on the overview of the module at the end of the semester.
5. Conducting different techniques of PRA in village.

Reference books:

1. *Principles of Agronomy- Reddy & Reddi – Kalyani Publishers.*
2. *Farmers' Participation in Agril. Research & Extension systems- S.K.Arora-Concept.*
3. *PRA – Methodology & Applications – Neela Mukherjee – Concept Publishing.*
4. *PRA & questionnaire survey – Neela Mukherjee – Concept Publishing..*
5. *Principles and practices of Dryland Agriculture- Govindan & Thirumurugan - KalyaniPublishers*

IRTD 305: Crop Production Technology (Credits 4+3 = 7)

Objectives:

This paper helps the students to familiarize with:

1. the basics of plant physiology.
2. the production technology of important cereals of Jharkhand like paddy, wheat, maize and finger millet.
3. the production technology of important pulse and oilseed crops in Jharkhand.
4. the production technology of jute, tea and sugarcane in Jharkhand

1. Basics of Plant physiology

8 hrs

Introduction, Osmotic relation of plant cells, Absorption of water by plants, loss of water by plants, Enzymes, photosynthesis, respiration, nitrogen cycle, photoperiodism, juvenility, maturity, ageing and death.

2. Production technology of Cereals:

22 hrs

Rice: Botanical description, species & varieties, climate & soil, seed rate & spacing, fertilisation, water management, irrigation methods, weed management, pest & disease management, ripening, harvesting and post harvest management. SRI method of paddy cultivation. Wheat: Botanical description, species & varieties, climate & soil, seed rate & spacing, fertilisation, water management, irrigation methods, weed management, pest & disease management, ripening, harvesting and post-harvest management. Maize and millets *etc.*

- 3. Production technology of pulses:** **10 hrs**
 NPDP- objectives, Factors limiting pulse production. Main emphasis for increasing pulse production. Botanical description, species & varieties, climate & soil, seed rate & spacing, fertilisation, water management, irrigation methods, weed management, pest & disease management, ripening, harvesting and post harvest management.
- 4. Production technology of Oilseed crops:** **9 hrs**
 Oilseed- Mission, Factors limiting oilseed production. Main emphasis for increasing oilseed Production. Botanical description, species & varieties, climate & soil, seed rate & spacing, fertilisation, water management, irrigation methods, weed management, pest & disease management, ripening, harvesting and post harvest management
- 5. Production technology of jute, tea and sugarcane.** **9hrs**
 Jute - Botanical description, species & varieties, climate & soil, seed rate & spacing, fertilisation, water management, irrigation methods, weed management, ripening, harvesting, retting, pest & disease management and quality parameter.
 Sugarcane- Botanical description, climate & soil, species & varieties, planting material, seed rate & spacing, fertilisation, water management, irrigation methods, weed management, ripening, pest & disease management, Ratoon management for higher productivity, advantages of rationing.
 Tea- Botanical description, climate & soil, species & varieties, planting material, seed rate & spacing, planting & pruning, shading of tea plantation, fertilisation, water management, irrigation methods, weed management, ripening, pest & disease management,
- 6. Production technology for the important *Kharif* and early winter vegetables.** **8 hrs**
 GAP for Okra, Cowpea, French bean, Early Cauliflower, Kharif potato, Spinach, Radish *etc.*
- 7. Principles and concepts of Agricultural Meteorology.** **4 hrs**
 Definition, importance and necessity, weather fore casting methods *etc.*
- 8. Different cost concepts.** **2 hrs**
 Fixed cost, variable cost, Cost- A_1 , A_2 , B, C *etc.*

Practical:

1. Seed bed preparation for rice cultivation –Dry, Wet and Dapog method.
2. Cultivation of paddy (upland, medium and low land condition), maize, green gram, pigeon pea, pea, gram, sunflower, soybean, sesame, mustard, wheat, finger millet *etc* and important winter vegetables in small plots maintained by the students in Divyayan and to record all pests and diseases including abnormalities.
3. Calculation of Cropping Intensity and Cost Benefit (C: B) ratio
4. Specific Gravity test of seed with 10% Brine solution i.e. seed purity test.
5. Germination test, method of seed treatment and sowing & calculation of yield.
6. Cost of cultivation of main crops (Cereals, Pulses, Oilseeds & Vegetables)- 2each
7. Calculation of expected yield from paddy grain.
8. Seminar on the overview of the module at the end of the semester.

Reference books:

1. *Textbook of field Crops production – ICAR publication.*
2. *Science of field crop production – Hunsigi & Krishna – Oxford & IBH*
3. *Handbook of Agriculture – ICAR publication.*
4. Vegetable Production-B. Choudhury.

IRTD 306: Personality Development -II (Credits 3 + 0 = 3)

Personality development: -

- | | |
|---|--------|
| 1. Two selected Vedic mantras -- chanting and meaning | 2 hrs |
| 2. Five shlokas selected from the Gita and the Upanishads – chanting and meaning | 2 hrs |
| 3. Education: Concept and philosophy, education for the women, and education for the masses | 2 hrs |
| 4. Great Educators and their methods: Upanishadic Rishis, Booker T. Washington, R.N Tagore | 4 hrs |
| 5. Manifestation of: <i>Shradhha</i> : Satyakam, Aruni, Thomas Alva Edison, Jagadish Ch. Bose, | 4 hrs |
| 6. Education as the key: Swami Vivekananda | 2 hrs |
| 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 | 7 hrs |
| 8. Great Teachers of morality: Socrates, Abraham Lincoln | 2 hrs |
| 9. Life and teaching of two great personalities—(to be selected) | 10 hrs |
| 10. Quiz, Group Discussion, Seminar, Mock interview, Role playing. | 5 hrs |

- Ref.: 1. Education—Swami Vivekananda
2. Universal ethics and moral conduct – Swami Vivekananda.

Notes: Seminar on the overview of the module at the end of the semester.

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Add-on Course:

IRTD-307: Computer Application-I (Credit 1+ 2= 3)

*****THE END*****

SEMESTER IV

IRTD- 401: Development Communication: (Credits 4 + 2 = 6)

Objectives:

This paper help the students to familiarize with:

1. the basics aspects of communication for development.
2. the tools, techniques and methods of information dissemination for rural development.
3. the changing milieu of development communication paradigm.
4. the application and role of ICT and its subsequent effects on rural people.

1. Basic theory-concepts and meaning of communication.

5 hrs

Concept and meaning; communication – two way process; communication process; communication varieties. Theories- Social marketing, dependency theories, participatory theories.

2. Meaning, concept and definition of development communication.

5 hrs

Historical background ; schools of development communication – Bretton Wood’s school, Latin American school, Indian School, African School, Los Banos School, Participatory school; examples of development communication; International Communication.

3. Understanding the dynamics of rural communication. 6 hrs

Concept and meaning, characteristics; challenges to rural communication, communication vs. information; communication for development; theoretical models; Agricultural development and development communication ;application of communication – project designing, mobilising rural people, rural training programme; communication and rural change ; communication campaign; elements of communication planning.

4. Communication process, principles and its need. 6 hrs

Definition of communication; communication models like Aristotle, Leagan’s, Berlo’s , Shannon Weaver Westley and Machean etc.Flow of information; communication situation. Dimensions and approaches of communication;

5. Communication method -- individual, group and mass method. 8 hrs

Advantages and disadvantages of Individual, group and mass approaches. Demonstration – objectives of demonstration ; types of demonstration- like result ,method composite, Front Line etc. ; planning the demonstration ; criteria for selection of demonstration plots ; tips for conducting good demonstration ; phases of demonstration ; communication through written words ; Definition of news and pyramid structure of news writing; radio talk and script writing .

6. Traditional and electronic media, Audio-visual aids- classification and its application. 8 hrs

Definition and classification of A.V.aids; advantages and scope of A.V.aids; functions of AV aids. Posters,leaflet,pamphlet and bulletin, circular letter ,Flash cards, Flannel graph Charts – types like flow chart ,tree chart, flip chart etc., graph like pie graph, pictograph etc.; Projected aids – types of projected aids

7. Features of various communication tools and its uses. 6 hrs

Media and rural development; types of communication tools- physical, cultural, institutional. Prospect and constrains of communication tools – TV, Radio, video, film strips audio cassette, printed material, folk media like theatre ,puppetry, story telling, folk song etc.

8. Barrier to communication in rural area. 6 hrs

Motivating our audience – wish for security, wish for response, wish for recognition, wish for new experience and blocks to participation – fear,insecurity,lack of knowledge, lack of time lack of skill, vested interest, group values, group means, group demand.

9. Factors of effective communication. 7 hrs

Policies enabling effective communication between research, advisory services, and farmers’ organizations in rural areas. Service providers are skilled in communication and have a positive attitude to communicate with clients. Systematic learning from experiences in communication approaches. Representative farmers’ organizations as partners in communication.

10. Communication channels for participatory development. RTI (Right To Information) Act. 6hrs

Classification & characteristic of communication channels; Definition and background of RTI Act, process, types of information; undisclosed documents: excluded agencies and organisation

11. Role of information and communication Technology (ICT) in rural development. 4 hrs

12. ICTs-Concepts, definition, tools and application in extension education: Reorganizing the extension efforts using ICTs advantages, limitations and opportunities. ICTs projects; different models to ICTs; ICT usage in field of extension. ICT extension approaches; Village Resource Centre (VRC)- Concept, objectives and application, tele-education, telephone conferencing, community radio etc. **5 hrs**

Practical:

1. Preparations of posters, leaflets, posters, charts, flash cards, formal groups and circular letters.

2. Identifying the types and barriers of rural communication (both physical and cultural).
3. Impact assessment of mass media on the rural people (Survey conducted in a selected village).
4. On field demonstration in a village on specific topic (Using leaflets, charts audio-visuals etc)/ PowerPoint presentation on previous practical experience/ Arrangement of Gram Sabha (group method) for understanding the local problem and writing a report on that.

5. Creation of extension blogs and visit to ICT extension projects.

6. Seminar on policy, plan and programmes of central and state govt. related to the module and e-governance.
7. Seminar on the overview of the module at the end of the semester.

Recommended Books:-

1. Extension communication and Management – G.L. Ray, Kalyani Publishers.
2. Education and communication for development – Dahama & Bhatnagar, Oxford & IBH.
3. Severin, Werner J., Tankard, James W., Jr., (1979). *Communication Theories: Origins, Methods, Uses*. New York: Hastings House.
4. Agunga, R.A. (1997) *Developing the Third world. A communication approach*. Commack, NY: Nova Science.
5. D. Dasgupta, Extension Education. Agrobios

IRTD- 402: Rural Development Administration: (Credits 4+0 = 4)

Objectives:

The students would be acquainted with

- 1) the meaning, nature and scope of development administration and its perspectives.
- 2) the strategy, structure and implementation of developmental activities .
- 3) the role of bureaucrats and other coordinating agencies in rural transformation.
- 4) the dimensions of tribal administration in India.

1. Administration in India: Emergence of the concept. 6 hrs

Definition of administration, traditional administration, development administration, difference between traditional and development administration. Elements of development administration, concept of e-governance.

2. Evolution of Rural Development Administration: Pre-Independence and post-Independence phases. 6 hrs

Pre-independence administration in Rural India – Agriculture oriented economy, caste system, feudalism, village administration. Evolution of rural development administration. Phases of development administration – Classification by Maheswari.

- 3. Extension administration: Concepts and objectives.** **6 hrs**
 Extension administration vs. general administration with special reference to extension service in India.
 Organizational setup for extension service including T& V system at different levels.
 Supervision in Extension, meaning, purpose, role and function of a supervisor, Principles and art of supervisor.
- 4. Administrative structure at village, Panchayat, Block and district levels.** **6 hrs**
 Administrative definition of village, panchayat, block, sub-division and district. Three tier system and its coordinated activities. District administration- role of collector, deputy commissioner, SDO, BDO and other functionaries responsible for rural development work. Administrative function of village panchayat-general function, judicial function, land management function etc.
- 5. Linkage with development structure at Centre and State levels.** **8 hrs**
 Development structure- institutional framework of rural development administration, three level of governance- Centre, State, Local- Urban and Rural. Ministry of Rural development, Departments of rural development, PRI, training institutions – NIRD, SIRD and other allied agencies like CAPART. Welfare administration, Ministry of social justice and empowerment, Central social welfare board (CSWB). Other ministry of rural development like agriculture, human resource development, health and family welfare etc.
- 6. Linkage with co-operative and Panchayati Raj Institution.** **6 hrs**
 Structure and functioning of Panchayati Raj, Grama Panchayat, Naya Panchayat (Rural Judiciary), Panchayat Samity, Zilla Parishad, Co-operative movement: history of co-operative movement in India, importance of co-operative movement, organisational patterns of co-operative structure, success and failure of co-operative movement, suggestions. Role of PRI in co-operative movement.
- 7. Role of co-ordinating agencies including DRDA.** **8 hrs**
 Role and functions of DRDA, organizational structures of DRDA, wings of DRDA- womens wing, engineering wing, self-employment wing, monitoring and evaluation wing etc. Administration of DRDA-composition of governing body of DRDA
- 8. Planning and execution in rural development administration.** **7 hrs**
 Implementation strategy- policy formulation, programme design, fund allocation and disbursement, programme implementation, monitoring and evaluation- periodical progress report, utilization and audit reports, impact assessment studies. Information strategy for rural development
- 9. Linkage with Centre and State planning; district and block planning.** **6 hrs**
 Central level coordination committee (CLCC) - composition, functions. State level coordination committee(SLCC)- composition, functions. Factors considered for district planning, constituents of district plan like development of cooperatives, village and small industries, land reforms, welfare of backward classes etc.
- 10. Bureaucracy and rural change** **6 hrs**
 Emergence of the concept of bureaucracy, Max weber and bureaucracy, types of bureaucracy- guardian bureaucracy, caste bureaucracy, patronage bureaucracy and merit bureaucracy. Maladies of bureaucracy. Bureaucracy and development- Bureaucracy and challenges of development, changes in Indian bureaucracy.

11. Tribal development administration: constitutional provisions- traditional administrative set up in tribal region. 4 hrs

History of tribal development administration, tribal development administration in post independent India, scheduled area, traditional tribal council and advent of panchayati raj, tribes of advisory council, commissioner of SC and ST. Ministry of tribal affair and its function for tribal development.

12. Sub-plan and organizational change for tribal development. MESO, LAMPS, NAREGA. 3 hrs

Five year planning and tribal development, strategy for 5th five year plan and tribal sub plan. Tribal administration and institutional set up- state level, district level, block level.

Recommended Books:-

1. Rural Development in India. D.N. Jena. 1998
2. Indian Administration. Avasthi and Avasthi.
3. Indian Administration - Singh,H.
4. Decentralized Planning and participatory Rural Development - Purnendu Sekhar Das

Notes: Seminar on the overview of the module at the end of the semester.

IRTD- 403: Basic Animal Husbandry (Credit 3+3 = 6)

Objectives:

This paper helps the students to familiarize with:

1. the basics of livestock farming and associated activities.
 2. the different types of livestock breeds, their disease, treatment and management.
 3. the technology of production, requirements and importance of livestock industry in Jharkhand.
 4. the marketing and financial viability of livestock and poultry farming.
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A. Livestock Farming:

1. Introduction to animal husbandry. Brief history; Livestock resources in Jharkhand. 5 hrs
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). 10 hrs
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. **10 hrs**
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, importance of Integrated farming systems. 5 hrs

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.

4. Marketing of livestock products. 2 hrs

B. Poultry and Duck Farming:

1. Introduction, Brief history, Poultry resources in Jharkhand. 5 hrs

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. 5 hrs

‘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. 5 hrs

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. 5 hrs

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

4. Marketing of Poultry products. 2 hrs

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.
15. Visit to a model livestock and dairy farm.

Practical: Poultry

1. Approaching and handling of the Birds/animals.
2. Identification of common breeds of Poultry & duckery.
3. General principle for the housing of birds.

4. Identification of common feeds.
5. Formulation of **balanced ration** with available conventional and unconventional ingredients.
6. Identification of common diseases and their treatment.
7. Vaccination and deworming schedule in poultry.
8. First aid practices like – debeaking, wound dressing, recording of temperature,
- 9. Calculation of economy of a Poultry Farm and finding out Cost-Benefit Ratio.**
10. Visit to a model livestock /poultry farm.
11. Seminar on the overview of the module at the end of the semester

Recommended Books:-

1. Kukkut palan - RKM-Ranchi
2. Adhunik Go palan - RKM-Ranchi
3. handbooh of animal Husbandry-G.C.Bannerjee; Oxford & IBH.

IRTD- 404: Organic Agriculture (Credits 3+4 = 7)

The students would be acquainted with

- 1) the principles, advantages and limitation of organic farming and natural farming .
- 2) the agricultural heritage of India viz. Vedic, biodynamic etc.
- 3) the role and production of different types of compost and vermitechnology.
- 4) the importance of Integrated Nutrient Management.

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| 1. Organic farming: | 8 hrs |
| 1.1 Concept and definition, objectives, need of the nation, advantages and limitations. - | |
| 1.2 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, | 8 hrs |
| An introduction and uses of some indigenous technical knowledge (ITK) and resource conserving techniques (RCT), cost-benefit ratio in organic farming <i>vis-a-vis</i> inorganic farming, two case studies. | |
| 3. Compost-- Different methods of composting like NADEP method, speed method, pit method, heap method from crop residues, cow dung and poultry litters. | 8 hrs |
| 4. Earthworms: | 8 hrs |
| 4.1 Classification and role of earthworms in agriculture to improve physical, chemical and biological properties of soil and quality of products. Anatomy of earthworm; enemies of earthworm. | |
| 4.2 Vermi-technology- concept, vermiculture, vermicomposting - steps , hip 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. | 7 hrs |
| 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: | 8 hrs |
| 6.1 An introduction to Vedic agriculture with reference to Vrikshayurveda. | |
| 6.2 Panchagavya and crop production, scientific rationale for efficacy of panchagavya on crop growth and productivity. | |

7. Bio-dynamics in agriculture-

3hrs

Concept and its application in agriculture. Preparation of BD 500 and BD-501. (Cow horn silica)- steps, result and application.

8. Natural farming-concept and definition, advantages and constraints in natural farming.

4hrs

Practical:

1. Preparation of compost through various methods like Nadep, speed, pit and heap from crop residues, cow dung as well as poultry litters
- 2.1 Study of physical characteristics of earthworms,
- 2.2 Preparation of vermicompost, vermiwash and techniques of vermiculture- both in farm as well as in field.
3. Preparation of poudh sanjivani(PS) and Beej sanjivani(BS) from cattle urine and cow dung and their uses in agriculture.
4. Preparation and use of panchagavya to increase fertility of soil, control disease and insects.
5. Preparation of horn manure BD-500 and its application in field.
6. Cultivation and record keeping of at least four crops using low cost inputs for integrated organic farming.
7. Crop rotations for low, medium and upland of Jharkhand under rainfed and irrigated conditions.
8. Preparation of plan for a model organic farm of 1 acre.
9. Visit to an organic farm (if possible).
10. Commercial and farmer's approaches towards preparation of vermicompost.
11. Seminar on ICAR and agricultural departments.
12. Seminar on the overview of the module at the end of the semester.

Recommended Books:-

1. One straw revolution: Masanobu Fukuoka, Book Venture, Chennai
2. Organic Farming: Theory and practice: S P Palaniappan, K Annadurai, Scientific Publishers, Jodhpur
3. Sustainability through Organic Agriculture: M Joshi and T K Prabhakarasetty, Kalyani Publishers, Ludhiana
4. An article : Action Research Report on Subhash Palekar's zero budget natural farming
5. Kumarappa Foundation : small farm
6. Sustainable Farming: BAIF Foundation, Karnataka
7. Bio-farming: Govt. of Madhyapradesh
8. Panchagavya: Boon to organic farming: C. Swaminathan, V. Swaminathan, International Books Distributors Co.
9. Earthworm: RK Bhatnagar and RK Palita, Kayani Publishers
10. Silent Spring: Rachel Carson, Other India Press, Goa
11. The road back to Nature: Masanobu Fukuoka, Book Venture, Chennai
12. The natural way of farming: Masanobu Fukuoka, Book Venture, Chennai
13. Handbook of Agriculture, ICAR
14. Handbook of fertilizer usage, FAI, New Delhi-67
15. Soil fertility and fertilizers by Tisdell, Nelson et al., PHI

IRTD- 405: Rural Banking: (Credits 3+0 = 3)

Objectives:

The students would be acquainted with

- 1) the institutional structure of rural financing in India.
- 2) the functioning of financial institutions in rural development.
- 3) the role, constraints and future challenges of banks in rural development.
- 4) the recent financial schemes of Govt. for rural and agricultural development.

- 1. Financial institutions for rural development- Basic understanding of rural and development credit.** **4 hrs**
 Concept of Bank, Banking, Rural banking. Classification of banking, role of rural banking in rural development
- 2. Institutional structure for rural financing in India-** **6hrs**
 Policy and schemes of NABARD, recent financing scheme of Government. Institutional structure for rural financing in India- the policies and schemes of NABARD. Recent financing schemes of Govt. like Composite cash credit, Kisan credit card, Kisan gold card, kisan subidha card, artisans credit card - objectives, eligibility, purpose, security, credit limit, insurance, interest rate, margin money, repayment etc. NABARD scheme of promoting SHG through vikas volunteer vahini.
- 3. Development of cooperative banks in India with special reference to PACS, CCBs, LDBs.** **4hrs**
 Role and objectives of cooperative bank
- 4. Rural financing through commercial banks- before and after nationalization of banks, Branch expansion policy and programmes.** **6 hrs**
 Reserve bank of India- main functions. Nationalization of banks. Direct finance, indirect finance, retail trade, micro-credit, education loan and repayment. Lead bank scheme- regional consultative committees, state level review committee, state level bankers committee, district level consultative committee, district level review committee block level bankers committee, block level coordination committee - functions
- 5. Emergence of RRBs – policy, objectives, functions, progress and achievements.** **4hrs**
 Objectives, policy, functions, progress and achievements of RRB.
- 6. Banks performance in development programmes- constraints and future challenges.** **4hrs**
 Banks and rural development, Constraints of bank financing, future challenges of banking,
- 7. Changing concept of rural financing – micro credit system, linkage of Banks with SHG and NGOs. Financing for agriculture and allied activities.** **6hrs**
 Quantum of finance, production and investment line of credit, margin, security, documentation, hypothecation, mortgage. Short term agricultural credit, application of interest in agricultural finance, salient features of different agricultural schemes. Creation of changes as per agricultural credit act. Crop insurance scheme. changing concept of rural finance. Micro-credit system, Micro-credit institutions. Rural micro-credit extension through SHGs, linkage of banks with SHG and NGOs, Assessing of SHGs under bank linkage programme, selection criteria of SHGs for linkage. Financing of SHGs through NGOs. Why SHG through farmers club?
- 8. Financing for agriculture and allied activities.** **8 hrs**
- 9. Agricultural Finance.** **7hrs**
- 10. Case Studies.** **3 hrs**

Recommended Books:-

1. Bank financing & Agril. Development - Ansari,M.H.
2. Rural credit & SHG - Karmakar,K.G.

Notes: Seminar on the overview of the module at the end of the semester.

IRTD- 406: Personality Development – III (Credits 3 + 0 = 3)

Personality development: -

1. Two selected Vedic mantras -- chanting and meaning
2. Five shlokas selected from the Gita and the Upanishads– chanting and meaning
3. Character --- Definition, How to form character?
4. Self effort for character building: *Yoga Sutras*
5. Make your own destiny.
6. Importance of will power in our lives; How to develop will power?
7. Role of social Service in Personality growth: The ideal of service in Ramakrishna Mission
8. Our duty towards our motherland and the society
9. Life and teachings of two great personalities
- 10. Quiz, Group Discussion, Seminar, Mock interview, Role playing.**

Recommended Books:-

1. Rebuild India – Swami Vivekananda
2. Swami Vivekananda and the world of youth—Nabani Haran Mukhopadhyaya.
3. How to Build Character: Swami Budhananda
4. Will Power and Its Development -- Swami Budhananda

Notes: Seminar on the overview of the module at the end of the semester.

SEMESTER V

IRTD 501: Rural and Tribal Demography (Credit 3+2 =5)

Objectives:

This paper helps the students to familiarize with:

1. the basics of population perspectives of rural and tribal India.
 2. the different concepts and elements related to population analysis.
 3. the theoretical perspectives of demography and composition of Indian population.
 4. the relevance of demographic study and its application on current social concerns.
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1. Introduction to Demography:

- 1.1. Concepts, Aspects of Demography, Objectives, Scope of Social Demography, Institutional Demography Importance and Application, Methods of population analysis- rate, ratios, proportion, percentages, incidence and prevalence. **5hrs**
- 1.2. Sources of Population Data- Census, Civil Registration System (CRS), Sample registration System (SRS), National Sample Survey (NSS), Demographic surveys and other sources. Nature and limitation of data from each of the sources. **2hrs**
- 1.3. Basic outline of theoretical perspectives- Important demographic concepts and theories of fertility, mortality migration and population transition; Malthusian theory, Neo-Malthusian, Marxian, Theories of Demographic transition. **5hrs**
- 1.4. Overview of Indian population with special reference to Jharkhand. **2hrs**

2. Elements of Population Studies

- 2.1. Fertility and Nuptiality- Basic concepts and significance of study, Levels, patterns and trends of nuptiality and fertility in India; determinants of nuptiality and fertility. **4hrs**
- 2.2. Mortality and Morbidity- Basic concepts, types and significance, Levels, patterns, causes and trends of morbidity and mortality in India with special reference to infant and maternal mortality. Measures of morbidity. **4hrs**
- 2.3. Population Distribution and Migration- Levels, patterns and trends of population distribution and migration; types of migration, determinants and consequences of migration. **4hrs**
- 2.4. Laws and Population-Study of existing laws and regulations related to population dimensions, Indian population policies, structure, compositions and problems. **4hrs**

3. Rural Population Composition

- 3.1. Age and Sex:- Age Structure, Analysis of Age data, Factors determining Age Structure, Sex Structure, Sex Ratio, Causes of male dominated sex ratio in India, Factors affecting Sex Ratio. **4hrs**
- 3.2. Education, Occupation, and Income: - Literacy and educational attainment, Literacy in India, Population distribution in terms of occupation and Income. **4hrs**
- 3.3. Race, Religion and Ethnicity – Religious composition and ethnic composition of India. **2hrs**
- 3.4. Agricultural situation in India – Demographic perspectives. **2hrs**

4. Impact of Rural Demography on Current Social Concerns

- 4.1. Family and Demographic Change- Relations of demographic change, family size and structure; relationships of family members; lifestyles; role differentials of family members by gender and age. **3hrs**
- 4.2. Rural Demography and Public Health Issues of current interest as well as emerging topics in demography and public health. **2hrs**
- 4.3. Urbanization- concept of urbanization, urbanism, urban vs rural, factors affecting urbanization, measurement of urbanization. Economic Development - meaning, retarding and promoting factors of economic growth. Food and Environmental Resources – Its interrelationships and consequences on rural population in India. **4hrs**

5. Rural and Tribal population of India with special reference to Jharkhand: 3hrs

Overview and dynamics of selected demographic parameters- age and sex wise population distribution, fertility, mortality, migration, labor-force, non-labor force, working force, occupational structure, displacement and development, causes and consequence of tribal labor migration.

Practical:

1. Incidence and prevalence of morbidity rate in a community.
2. Distribution of households and household population by residence of a village.
3. Distribution of households by selected parameters (Education / Income) of a village.
4. Distribution of households on the basis of agricultural land holding.
5. Percentage Distribution of Household Head by Socio-economic Characteristics and Sex.
6. Any topic of the theoretical portion as decided by the teacher.

Recommended Books:-

1. United Nations, *The Millennium Development Goals Report, 2005*
2. Siegel, J.S: *Applied Demography: Applications to Business, Government, Law and Public Policy.* Academic Press, San Diego (2002).
3. Weeks, John, R.: *Population: An Introduction to Concepts and Issues. 8th Edn. Wadsworth Thomson Learning, U.S.A(2002).*
4. *Census of India (1991, 2001).*
5. *Jhinghan, M.L & others. Demography-An introduction. Vrinda.*
6. Mutharayappa, R. *Tribal fertility, mortality & health care practices. Mittal.*

Journal: 1) *Population Studies.* 2) *Demography India.* 3) *Agricultural Situation in India*

IRTD 502: Agricultural Bio-technology (Credits 3 + 4 = 7)

Objectives:

This paper helps the students to familiarize with:

1. the basics of biotechnology and its application to agriculture.
 2. the handling and use of different laboratory equipments.
 3. the technology of production of biofertilizers and biofungicides.
 4. the essentials of soil biotechnology.
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1. Definition of Biotechnology and its importance (with special reference to Agriculture Biotech).

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| 1.1. Definition- different concepts, | 1hrs |
| 1.2. Related scientists and their contribution, | 2 hrs |
| 1.3. Fields related with Biotechnology and its importance. | 2 hrs |

2. Introduction to Microbial biotechnology with special reference to Soil Microbiology.

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| 2.1. Soil- definition, its constituents, microbial flora of soil, | 2hrs |
| 2.2 Rhizosphere- classification of bacteria. | 2hrs |

3. Introduction to laboratory equipments and their use.

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| 3.1 Equipment for microbial culture, Different media, their preparation method and importance. | 4 hrs |
| 3.2 What is <i>in vitro</i> practice and how is it different from <i>in vivo</i> practices. | 2 hrs |
| 3.3 Microbial growth and nutritional requirements, gaseous requirements of bacteria. | 2 hrs |
| 3.4 Types of microbial culture, Microbial cell culture techniques (a) Aerobic and (b) Anaerobic . | 4 hrs |
| 3.5 Preservation and maintenance of microbial culture; Lyophilisation, periodic transfer, by mineral oil, low temperature. | 3 hrs |
| 3.6 Use of farm soil bacteria in making biofertilizers – Azotobacter, PSB, Azospirillum (from isolation to mass culture) , Rhizobium- isolation from root nodules and mass cultivation. | 5 hrs |
| 3.7 Use and preparation of botanical biopesticides and biofungicides (<i>Trichoderma viridae</i> , <i>Trichoderma herzanim</i>), Bacterial Insecticide (<i>Bacillus thuringiensis</i> , <i>Bacillus substelis</i>). | 3 hrs |
| 3.8 Comparative study between organic and biotechnological biopesticides /biofertilizers. | 1 hrs |
| 3.9 Advantages and disadvantages of the use of Biofertilizers and biopesticides | 2 hrs |

4. Introduction to Plant tissue culture

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| 4.1 Terminology | 1 hrs |
| 4.2 Plant tissue culture from explant inoculation to field transfer, totipotency and Plasticity with reference to suitable commercial crops in vegetable, fruits, flower, medicinal plants. | 2 hrs |
| 4.3 History of tissue culture techniques | 1 hrs |

4.4 Tissue culture techniques – Infrastructure, Equipments, media and its components, basic steps, culture Types, application.	2 hrs
4.5 Micropropagation- stages, application,	1 hrs
5. Soil Biotechnology	
5.1 Brief introduction, Nitrogen cycle,	3 hrs
5.2 Symbiotic and non-symbiotic microbes; symbiotic Biological Nitrogen Fixation (BNF)and leguminous plants, nitrogenase activity,	4 hrs
5.3 Role of Phosphorous Solubilising Bacteria (PSB), mycorrhizae, Vascular arbuscular mycorrhizae(VAM), <i>Rhizobium</i> .	
5.4. Intellectual Property Rights (IPR), Quarantine, Biosafety, Bioethics).	2 hrs
5.5 Genetically modified crops (GMC); Disadvantage and Advantage.	3 hrs

Practical:

1. Characterization and identification of lab equipments.
2. Preparation of solid and liquid medium with pH test.
3. Sterilization of media and glassware.
4. Serial dilution method in case of soil samples of bacteria / fungi.
5. Inoculation techniques in Nutrient Broth (NB) and solid agar plate media.
 - 5.1. a) Isolation of biofertilizers / biopesticides related microbes from soil, sanjivani, sasyagavya, kunapajala, panchagavya, vermicompost etc.
 - b) Morphology and analogy of nodule, isolation of *Rhizobium* from nodules, seed treatment with *Rhizobia*.
 - c) Production and use of *Azotobacter sp.*, *Azospirillum sp.*, PSB, *Azolla*, *Rhizobium sp.* and *Trichoderma viride* related biopesticides and record their effect on crop production.
- 5.2 Preparation of pure culture by streak plate, pour plate and spread plate method.
- 5.3 Preservation and maintenance of culture by subculture (by preparing periodical slants)
- 5.4 Colony forming units count in case of pour plate and spread plate method .
- 5.5 Safe disposal practices. (Lab ethics)

Recommended Books:-

1. *Biotechnology: B D Singh, Kalyani Publishers.*
 2. *Plants propagation and its application on tissue culture: Aswani Kumar and Sikha Roy I K International Pvt. Ltd.*
 3. *SubbaRao, N.S. Soil Micro –biology. Oxford & IBH.*
 4. *Dwivedi, P. Plant tissue culture. Scientific.*
 5. *Dubey, R.C. A textbook of Biotechnology, S.Chand.*
 6. *Rangaswami & Bagyaraj. Agricultural Microbiology, Prentice Hall.*
 7. *Microbiology – Pelczar, Chan, Krieg, TATA Mcgraw-Hill.*
- Journal: *Indian Journal of Biotechnology.*

IRTD 503: Rural & Agricultural Marketing (Credits 3+2 = 5)

Objectives:

This paper helps the students to familiarize with:

1. the concepts and aspects related to traditional and rural marketing systems.
2. the evolving concepts in the modern marketing systems.
3. the marketing services, channels and agencies involved in rural marketing.
4. the different Act and policies to improve the rural marketing systems.

1. Traditional Marketing system in Rural Areas:

- 1.1 The traditional marketing system in a subsistence economy and the barter economy – Types of distribution system – Reciprocity, Types of reciprocity – Generalized, Balanced, Negative, Kula trade, Tribal market and trade, redistribution, market exchange. **3hrs**
- 1.2 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, Role of NGO in Rural Marketing, Perspective of rural marketing. **4hrs**

2. Modern marketing systems in rural areas: Unorganized market.

- 2.1 Characteristics of modern marketing system -, Co-operative marketing, Advantages of co – operative marketing, Development of Co – operative Marketing, Contract Farming, Government and Agricultural Marketing, Factors affecting modern rural marketing system. Basic facilities, characteristics and defects of Rural Agricultural Marketing. Impact of WTO in Rural Marketing. **6hrs**
- 2.2 Marketing services- institutional infrastructure for rural marketing – Agricultural Co-operative Marketing Societies, Food Corporation of India (FCI), Commission on Agricultural Cost and Prices, Directorate of Economics and Statistics, Central and State Warehousing Corporation, National Horticultural Board, Tribal Co-operative Marketing Development Federation, Agricultural and Processed Food Products Export Development Corporation, Directorate of Marketing and Inspection, Jharkhand Agricultural Co – operative of Lac Marketing Federation, Farmer’s Service Co – operative Societies, Consumer Co – operative Societies. **7hrs**
- 2.3 Marketing channels – Market appraisal of rural market, 4 Ps of marketing, 4 Os of marketing, Approaches to the study of rural marketing – Exchange function, Physical function, Facilitating Function. **3 hrs**
- 2.4 Different agencies involved in rural marketing including corporate sectors like Reliance fresh, Food Bazaar, Spencers etc. **3 hrs**
- 2.5 Role of different agents with special reference to middle men. **2 hrs**
- 2.6 Distribution and benefits, producers’ share in the consumers’ rupee. **2 hrs**
- 2.7 Price spread and its impact on producer and consumer. **2 hrs**
- 2.8 Defects of rural marketing, its effect on the rural poor, different forms of exploitation. **2 hrs**
- 2.9 Producer’ surplus—meaning, types of producer’s surplus, marketed and marketable surplus. Factors affecting marketable surplus. **2 hrs**

3. Steps taken by Government to improve the marketing system:

- 3.1 Legislative measures – Agricultural Producers’ Marketing Act (APMC- 2003), Salient Features of Model Act – 2003, Rural Agricultural market reforms, Future trading, National Agricultural Policy 2000, RAINBOW revolution. **4 hrs**
- 3.2 Different agencies/institutions started by the Govt.: outcome, defects and remedies, NAFED, IFFCO, KRIBHO, NCDC, STC, NIAM. **4 hrs**
- 3.3 Regulated markets – Features of Regulated market, Aim and defects of regulated market. **2hrs**
- 3.4 Information and Communication Technology (ICT) in marketing – Role, advantage Important areas of rural market development Village Information Kiosks, Info – Village Puducheri, ISRO – MSSRF Project INSAT. **6hrs**
- 4.0 Business Ethics and e-marketing. 2hrs**

Practical:

1. Study of a village market (Mandi) to analyse the marketing chain and its functioning.
2. Visit to a vegetable/dairy cooperative society/regulated market to study its functioning.
3. Visit to Food Corporation of India/ state ware house Godown and subsequent report submission on its functioning channel.
4. Study on e-chaupal, internet marketing.

Recommended Books:-

1. Singh, Kumar, A and Pandey, S.P. 2005. *Rural Marketing: Indian Perspectives*. New Age International Publishers.
2. Verma, S.B, Jiloka, S.K and Mondal, B. 2006 *Rural Agriculture and Marketing*. Deep and Deep Publishers Pvt. Ltd. New Delhi.
3. Rajendra & Sanjay. *Rural marketing : New dimensions*, Adhyayan Pub.
4. Johl, S.S and Kapur, T.R *Fundamentals. Of farm business management*, Kalyani publishers.
5. R.V Vadi & N.V. Vadi. *Rural Marketing*. Himalaya Pub

Journal: 1) *Agricultural Marketing*. 2) *Indian Journal of Agricultural Marketing*. 3) *Kurukshetra*.
3. *Indian Economy*

IRTD 504: Entrepreneurship Development (Credits 3+2 = 5)

Objectives:

This paper helps the students to familiarize with:

1. the concepts, theories, problems and prospects of entrepreneurship.
2. the entrepreneurial qualities and the factors motivating for entrepreneurship.
3. the need, content phases and constraint of entrepreneurship development programme.
4. the process of technical, financial and market analysis for establishing an enterprise.

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- 1. Entrepreneurship:** Definition and Concepts, Characteristics Elements, Process, Need for entrepreneurship. **2hrs**
 - 2. Problems and prospects.** Entrepreneurial Behavior, Barriers of Entrepreneurship – Economic and Non- Economic. **2hrs**
 - 3. Screening of entrepreneurs** – Character, Involvement in the Project , Financial Resources, Competence, Initiatives, Intelligence, Drive and Energy, Self Confidence, Frankness, Patience. **3hrs**
 - 4. Entrepreneurial culture and structure** – Entrepreneurial Value – Innovativeness, Independence, Outstanding performance, Respect for work, Attitudes. **2hrs**
 - 5. Competing theories of entrepreneurship** – Economic, Psychological, Sociological and Cultural, Theories of High Achievement, Theory of Profit, Theory of Market Equilibrium, Joseph Schumpeter’s Economic Theory. **3hrs**
 - 6. Entrepreneurial qualities and classification** - Classification of entrepreneurs –Spontaneous, Motivated and Induced. **2hrs**
 - 7. Entrepreneurial motivation** – Process of motivation – Entrepreneurial motivation, Achievement motivation, Factors for Entrepreneurial motivation Creativity, Innovation, Stages of creative process, Characteristics of Creative People. **4 hrs**

- 8. Establishing entrepreneurial systems** – Identification, Formulation Appraisal, Implementation, Monitoring, Evaluation. **3hrs**
- 9. Entrepreneurship Development Programmes** - Entrepreneurship Development Programme (EDP) – Need, Objectives, Course content and Curriculum, Phases of EDP, Problem faced by EDP. **4hrs**
- 10. Growth of entrepreneurship** – women, rural, others – Concept of women entrepreneurs, shift from 3P to 3E, Functions of women entrepreneurs, growth of women entrepreneurs, factors for women entrepreneurship, Problems of women entrepreneurs, Meaning of rural Entrepreneurship, need for rural Entrepreneurship, Problems of rural Entrepreneurship. **4hrs**
- 11. Steps in starting a small enterprise.** **2hrs**
- 12. Project identification, classification and formulation** – Definition, Project Approach, Acronym of Project, Project Cycle, Project Appraisal Method of Project Appraisal – Economic Analysis, Financial Analysis, Technical Analysis , Market Analysis. **6hrs**
- 13. Techno-economic feasibility and feasibility report-** Meaning, Feasibility Report, Contents of Feasibility Report, Financial Ratio Analysis, SWOT (Strength Weakness Opportunities and Threats) analysis. Technical Appraisal of the Project, Plan Layout, Location of the Project. **6hrs**
- 14. Financial analysis** – Break Even Point (BEP)- Calculation of BEP, Project cost, profit, cash flow, Operating Cycle, Working Capital Ratio (WCR), Liquidity Ratio (LR), Performance Ratio (PR), Solvency Ratio. **5 hrs**
- 15. The support system** – Institutions assisting entrepreneurs and entrepreneurship, Micro Small Medium Enterprise, PMRY + KVIC = PMEGP. **4hrs**
- 16. Case studies.** **2hrs**
- Practical:
1. Planning of a small scale project for self employment.
 2. Case study of some self employed individual (Entrepreneur).
 3. Preparation of schedule for Market survey.
 4. Book-keeping, accounting costing and pricing of products – its procedures.
 5. Break–even analysis and financial ratio analysis.

Recommended Books:-

1. Verma, S.B. 2005. *Entrepreneurship and Employment*. Deep and Deep Publishers Pvt. Ltd. New Delhi.
2. Deghania, P. & Mahato, L.N. *Rural entrepreneurship development, Classical*
3. S.S.Khanka. *Entrepreneurial development*. S.Chand.
4. *Swanirbhar ki Or Vol-I*, RKM-Ranchi
5. R.K Sahu. *Training for Development*, Excel Books.

Journal: 1) *Laghu Udyog Samachar*. 2) *Yojana*.

IRTD 505: Research Methodology (Credits 3+2 = 5)

Objectives:

This paper helps the students to familiarize with:

1. the different techniques of data collection.
 2. the different technique of classification and tabulation of data..
 3. the different aspects of social research and sampling.
 4. the different statistical method for the analysis of research data.
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- 1. Introduction**-Meaning of statistics, aims of statistics, definition and limitations, need and scope, Meaning of classification, Objective of Classification, Characteristics of Classification, Modes of Classification, Classification of data, types of classification, tabulation of data, Objectives and Purpose of Tabulation, Types of tabulation. **6hrs**
- 2. Measurement of central tendency.** – Definition, computations – Mean, Median, Mode, Geometric, Mean , Harmonic Mean , Weighted Mean , merits and demerits. **4hrs**
- 3. Dispersion, correlation and Regression** – Concept, Measures of Dispersion, Uses of Dispersion; Co-relation co-efficient , Types of Co-relation, Properties of Co-relation ,Test of Significance, Regression co – efficient and its calculation, Principles of Least Square. **6hrs**
- 4. Social research vs. Social Survey** – Definition of Research, Research Process, Characteristics of Social Research, Objectives, Types, Scope, Quality of a Researcher, Sources of Data in Research, Meaning of Social Survey, Objectives, Types and Steps of Social Survey, Merits and Demerits of Social Survey, Difference between Social Research and Social Survey. **8hrs**
- 5. Sampling Techniques** – Meaning of Sampling, Some Concepts Related to Sampling – population, Sampling Frame, Sample, Sampling Fraction etc. Types of Sampling – Probability Sampling - Simple random sampling, stratified random sampling, Application , Merits and Demerits, Non - Probability Sampling –systematic, snow ball etc. sampling, Application , Merits and Demerits. **6hrs**
- 6. Elementary concept of Normal Distribution** – Mean Deviation, Co-efficient of Mean Deviation, Merit and Demerit of Mean Deviation, Methods of Calculation. Standard Deviation, Continuous series Discrete Series Characteristic, Uses, Concept of Variance. **4hrs**
- 7. Techniques of data collection** – Survey methods, Observation – Components, Types, Factors Controlled and Non Controlled method, Participant and Non Participant. Interview-Types, Merits and Demerits, Schedule - Types, Merits and Demerits , Questionnaire - Types, Merits and Demerits, Case studies - Types, Merits and Demerits , etc. and Participatory Rural Appraisal (PRA). **9hrs**
- 8. Principles of experimental designs** – Validity, basic principles of field experimentation, precision and accuracy, advantages of replication, experimental techniques. **4hrs**
- 9. Principles and procedures for analysis of agricultural data** **7 hrs**

Practical:

1. Analysis and interpretation of data like class interval.
2. Field plot techniques like RBD, LSD, and CRBD etc.
3. Writing a statistical analytical report.

Recommended Books:-

1. P.V.Young. *Scientific Social Surveys and Research.*
2. Chandel. *Agricultural Statistics.*
3. Kothari. *Research Methodology*
4. Lorena Madrigal. *Statistics for Anthropology.*
5. Sahu, P.K *Agriculture and Applied Statistics, Kalyani.*

IRTD 506: Personality Development – IV (Credits- 2+0=2)

1. Two selected Vedic mantras –chanting and meaning.
2. Five shloakas selected from the Gita and five shloakas selected from Upanishads - chanting and meaning.
3. Roots of Indian civilisation – cultural, and spiritual: saints and poets -Sri Shankaracharya, Mirabhai, Tulsidas, Shree Chaitanya and others.
4. Bases of Indian social life – four goals and four stages of life.
5. Duties of different stages of life – examples of ideal character.
6. Enlightened citizenship, moral and spiritual culture.
7. Life and teachings of two great personalities.
8. Quiz, Group Discussion, Seminar, Mock interview, Role playing.

SEMESTER VI

IRTD- 601: Integrated Crop Management : (Credits 3+2=5)

Objectives:

This paper helps the students to familiarize with:

1. the different methods of crop disease management.
2. the different IPM techniques for pest management
3. the management of water resources for better crop cultivation.
4. the different water conservation techniques.

1. Integrated Disease Management

10hrs

- 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

10 hrs

- 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 Dents 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.

3. Integrated Water Management

10 hrs

3.1 Irrigation—concept, need, aims, types – furrow, drip, flood, sprinkler, bed etc., methods, advantages and disadvantages, amount; fertigation. Criteria for scheduling irrigation, irrigation management for major crops -- cereals, fibre, tuber, pulses, oilseeds, sugar crops. Drainage-concept, classification, importance.

3.2 Water conservation through-- precision irrigation, management of crop residue, mulching practice in dryland for storing moisture, tillage, crop rotation and alternative crop strategies, water use efficiency, consumptive use efficiency, calculation of water recommend and irrigation need of crop principles of irrigation to dry land crops. Water harvesting, gravitational irrigation.

3.3 Soil properties and soil water use and irrigation, judicious use of surface and ground water, drainage systems, watershed management, irrigation requirements, irrigation efficiency.

4. Soil and water conservation:

6 hrs

- (i) Types of soil erosion; (ii) Soil forming rocks and weathering
- (iii) Concept, practice & scope of soil and water management

5. Integrated Nutrient Management

10 hrs

5.1 Limitation and adverse effects of chemical-fertilizer intensive crop growth technology (Green revolution) Need for integrated nutrient management (challenge of nutrient excess and depletion), efficient use of fertilizers.

5.2 Symptoms due to deficiency of nutrients; available and fixed nutrients in soil solution; soil pH and nutrient availability.

5.3 Common chemical fertilizer and organic manure sources and their nutrient contents, factors affecting fertilizer use, fertilizer use efficiency.

5.4 General recommendation of N, P, K, Ca, Mg, S and micro-nutrients for major crops, Uptake of plant nutrients in different crops (with their average yield), nutrient balance in soil.

5.5 Integrated Nutrient Management: concept, economic consideration, feasibility, advantages, Components (sources): soil, mineral fertilizers, organic /biological sources, INM in principal crops (rice, wheat, Maize, pulses, oilseed, cotton, etc.

6. Integrated weed Management technology- concept and its application.

8 hrs

Definition and concept of weeds, Classification of weeds, Characteristic features of weed, Harmful and beneficial effects of weeds, Persistence of weeds, Survival mechanism of weeds, weed management: Why should we be concerned about weeds, Essence of Noxious Weed Management, Weed Management

Strategies, Methods of weed control: Preventive measures, Eradication methods, Control methods: mechanical, chemical and biological along with their merits and demerits; Herbicides: Classification, formulation and their different types; Persistence of herbicide in soils, Integrated Weed Management: Why an integrated approach is important, General principles, strategies, crop specific examples of IWM and advantages of IWM.

Practical:

1. Irrigation design and scheduling in major crops, micro irrigation and fertigation techniques, water conservation techniques (mulching, micro-watershed), drainage system, local water harvesting techniques.
2. 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.
3. Classification of pesticides on the basis of their chemical composition.
4. Application of slow release fertilizers, biofertilizer application, mulching, application of N, P mobilizers and soil amendments, foliar spray of micro-nutrients, detection of nutrient deficiency symptoms in field, fertilizer scheduling and balanced fertilizers application from organic and inorganic sources.

Recommended Books:-

1. *jnkvv.nic.in ipm home and ncipm.org.in*
2. *Integrated Pest Management: principles and applications, Vol 1 and 2, (Rs. 1595 + Rs. 1595) published by NCIPM, IARI, Pusa, New Delhi – 12.*
3. *Handbook of Agriculture, ICAR*
4. *Principles and procedures of Plant Protection by S.B Chattopadhyay, Oxford & IBH*
5. *A textbook of Applied Entomology by KP Srivastava, Kalyani Publishers*
6. *Principles of Plant Pathology by RS Singh, Oxford & IBH*
7. *Environmental Soil Physics, Daniel Hillel, Academic press,*
8. *Principles of Agronomy, Reddy & Reddy, Kalyani pubs*

Appendix: Module-60P: 2.2 Classification of pesticides on the basis of their chemical composition.

IRTD- 602: Rural Development: Planning and Management (Credits 2+2=4)

Objectives:

This paper helps the students to familiarize with:

1. the concepts and aspects of the rural development management.
2. the functions of planning commission and features of different five year plans.
3. the concept of organizational development and its relevance in rural development.
4. the principles and aspects of farm management.

1. Management

6 hrs

Meaning, definition, theoretical aspects, historical development, traditional vs participation management
Process of management, types of management, management in administration, marketing management, financial and personnel management, functional areas of personnel management, human relation, objectives of human relation, difference between personnel management and human relations, industrial relations, human resource management, WTO – historical development, functions of WTO its relevance in development, rules and regulation and its impact on Indian economy.

2. Planning commission and five year plans in India. 6 hrs

Concept and definition of planning, levels of planning, aspects of integrated planning- spatial, temporal and functional. Types of planning, history of planning in India, planning commission in India, composition of planning commission, Brief objectives of 1st to 11th Five year plans. India Vision 2020, Village planning- formulation contents and methods.

3. Organizational development. 8 hrs

Meaning and assumptions of organizational development, stages of organizational development, identification of organization needs, identification of areas for in-depth analysis, concept of project and project proposal, relevance of organizational development in rural development, organizational development interventions, team building, organizational development in extension organization, basic elements of monitoring, some monitoring techniques value based organizational development.

4. Planning and management of rural development programmes for education, health and agriculture in Eastern India. 3 hrs

5. Farm management 4 hrs

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.

6. Law of diminishing return. 2 hrs

7. Principles involved in farm management decisions 3 hrs

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, types of farm budgeting – partial budgeting, enterprise budgeting, total or complete budgeting.

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

Farm Financial Management : Defination, 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.

Farm financial budget; methods of processing of farm credit proposals; farm credit analysis kit.

Management of farm resources: farm resources – land including layout, crop and crop rotations, soil, labour, machinery and buildings.

Farm labour management: Definition of farm labour. Agricultural wages and employment, classification of farm, labour, composition of farm labour; planning of labour distribution and management of labour.

Farm machinery management.

Practical:

1. 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.
2. Formulation of a plan for integrated development of a village.
3. Feasibility assessment of any programme/ project.

Recommended Books:-

1. Chambers, R. (1983) *Rural Development*, Longman Scientific & Technical.
 2. Sims, D. & Fineman, S. & Gabriel, Y., *Organizing and Organizations* London: Sage, 1993.
 3. Singh, S. P. 2003. *Planning and Management for Rural Development*. Manohar Publishers, New Delhi.
 4. Verma, S.B. 2005. *Rural Management*. Deep and Deep Publishers Pvt. Ltd. New Delhi.
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IRTD- 603: Personality Development - V (Credits 2+0=2)

Objectives:

This paper helps the students to familiarize with:

1. The Indian cultural & spiritual heritages and some great personalities/spiritual characters of different characters religions.
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1. Two selected Vedic mantras –chanting and meaning.
 2. Five shlokas selected from the Gita and Upanishads - chanting and meaning.
 3. Religion – Concept, goal and its utility in ones life and in an ordered society.
 4. An overview of world religions, teachers and texts – Hinduism, Buddhism, Islam and Christianity : Lord Buddha, Jesus Christ and Prophet Mohammed.
 5. Essence of the Gita.
 6. How to spiritualise our daily life – concept of practical spirituality.
 7. Four Yogas: Brief studies with emphasis on Karma Yoga.
 8. Synthesis of religions and paths
 - 9.1 Ramakrishna movement monogram – motto.
 10. Life and teachings of one great personality.
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IRTD- 604: Development of Non-Farm Sectors (Credits 3+2=5)

Objectives:

This paper helps the students to familiarize with:

1. the problems and possibilities of different traditional village crafts.
 2. the role of different rural non-farm sector promoting agencies.
 3. the role of cooperative sectors in the development of village industries
 4. the theoretical underpinnings related to non-farm sectors.
-

1. Definition and Scope of village Industries.

6 hrs

1.1 Traditional village crafts - its problem and possibilities.

Handicrafts – background, classification, designing in handicrafts, tribal handicraft as livelihood option, institution involved in handicraft promotion like Tribal Cooperative and Marketing Development Federation (TRIFED) – functions, National Centre for design and Product Development (NCDPD), Rural Non-farm Development Agency (RUDA), role of Khadi and Village Industry Commission (KVIC) in traditional craft promotion, Constraints of village crafts.

1.2 Scope of new village Industries and strategies for development.

Credit guarantee Fund Scheme for Small Scale Industry, Credit Link Capital Subsidy Scheme for Technology Upgradation of SSI, Village and Cottage Industry

2. KVIC and its role in promoting village crafts and industries. KVIC schemes like PMEGP 2 hrs

3. District Industrial centre (DIC)-its structure and function. 2hrs

4. Self employment 2 hrs

Need and importance of Entrepreneurship, government assistance to rural entrepreneurship.

5. Co-operatives and development of Industries. 6 hrs

Krishak Bharati Cooperative Limited (KRIBHCO), Indian Farmers fertilizers Cooperative (IFFCO), Anand Milk Cooperative Union Ltd (AMUL), National Agricultural Cooperative Marketing Federation Ltd (NAFED), Tribal Cooperative Development Corporation (TCDC), Jharkhand Lac Growers cooperative Society

6. Dominant theories of Rural Non-farm Sector (RNFS) growth in India. 10 hrs

Theories on the basis of Size of enterprise - Macro-level, Meso level and Micro level, Theories based on processing of raw materials, Theories on the basis marketability of product

7. National significance of the Rural Non-farm Economy (RNFE) 2 hrs

8. Role of the RNFE in rural livelihoods: proportions of income, allocations of time and labor. 4hrs

9. Spatial distribution of RNF sub-sectors. 3 hrs

10. Access and barriers to rural non-farm livelihoods. 3 hrs

11. Decentralization, governance and economic change of RNFE. 3 hrs

12. Government perception of the RNFE 4 hrs

NABARD Scheme assisted for RNFS, role of NABARD, NFS activities covered under NABARD

13. Role of rural towns in rural development and the RNFE. 3 hrs

14. Promotion of rural livelihoods: small town growth vs. village RNF enterprise. 4 hrs

Practical:

1. Study and project submission of a KVIC funded project.
2. To study the credit system of banks/NABARD related to RNFS.
3. Study and project submission of District Industry Centre (DIC) with relation to RNFS.
4. To study the village crafts prevalent in Ramakrishna Mission adopted villages.
5. Case study on any dying tribal craft tradition of Jharkhand.

Recommended Books:-

1. Basant, R., B.L. Kumar And R. Parthasarthy (1998) *Non-Agricultural Employment in Rural Gujarat*. Rawat Publications, Jaipur.
2. Mukhopadhyay, Swapna and C.P. Lim (1985) *Development and Diversification of Rural Industry in Asia, Asian and Pacific Development Centre, Kuala Lumpur.*
3. Visaria, P. and R. Basant (1994) *Non-Agricultural Employment in India: Trends and Prospects*, Sage, New Delhi.

Journal: 1) *Economic and political weekly.* 2) *Indian Journal of Agricultural Economics.*
3) *The Indian Journal of Labour Economics.*

IRTD- 605: Project Work (Credits 0+20 =20)

Objectives:

Practical:

1. Work Experience and Project Formulation
2. Project formulation - its techniques.
3. Project management- Critical Path Method (CPM), Programme Evaluation and Review Technique (PERT).
4. Project financing and monitoring.
5. Participatory evaluation Process
6. Report writing and presentation, Project Evaluation, Seminar and Viva-voce.

IRTD 606- Rural Living and Learning Experience (RLLE) - I (Credit 0+2=2)

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SEMESTER VII

IRTD 701: Integrated Rural and Tribal Development – Concept and Approaches (3+2=5)

Objectives:

This paper helps students to:

1. understand different developmental philosophy and its implication to rural change.
2. develop conceptual clarity on different approaches of rural development.
3. know historical background of welfare and voluntary action in India.
4. be familiar with different emerging rural development models in India and abroad.

Theory:

1. Concepts:

15 hrs

Growth, Progress, Development, economic growth vs development, types of development – social, economic. Sustainable development- Concept, types of sustainability, Green development, critique of sustainable development . Rural Development (RD) – concept of rural area or village, definitions of rural development, objectives of RD, different approaches of RD – sporadic, multipurpose, technological package etc. Tribal development – Approaches – segregation, integration, assimilation, concept of tribal development, initiatives, policies and practice since British period. Tribal development - issues and perspectives;

2. Changing trends in development approaches:

15 hrs

Welfare approach - Concept, objectives and examples. Development Approach - Concept, objectives and examples, Empowerment approach - Concept, objectives and examples; Sectoral Approach; Target Approach; Area approach; Minimum Need Approach; Integrated approach ; Participatory Development approach – meaning of participation, types of participation, background of participatory approach, application . Systemic Approach – origin, concept and principles, usefulness, stages . Livelihood approach – concept, components, principles. Capability approach – concept of Amartya Sen and Nussbaum, indicators of capability, measurement of capability.

3. Social Welfare services in India, Charity Philanthropy and Seva:

12 hrs

History of Voluntary action/ work in India: NGOs in India, government-NGO relation, national policy on the voluntary sector. Activities & Philosophy – Indian ideologies – Ancient, medieval and modern, Indian constitution. Western Ideologies – Ancient, medieval and modern. Different developmental Philosophy and their Genesis: Social Reform Movements in 19th and 20th Century at a glance;

4. Theories of Development in the context of Rural and tribal Development: 6 hrs

Classical, and Modern. Backwardness theory, Theory of Sociological and Economic Dualism, Strategy theory, socio-psychological theory, Labour surplus theories, dependence theory, towards general theory of development; Modernization and its implication for Rural and tribal Development; Recent trends in Rural and tribal Development – livelihood diversification, diminishing rural – urban divide, rural risks and vulnerability etc.

5. Emerging models of Rural Development: 6 hrs

Selected successful rural development experiments in India; Brief history of Rural Development of SAARC countries – medieval period, colonial period and post independent period; Lessons for future development with special reference to India – National goals, strategies – multiagency approach, peoples participation, PPP model etc.

Practical:

1. Preparation and presentation of an article on any successful rural development experiment/ programme/ approach through library work and review of literature. **5hrs**
2. Preparation of an article on major problems of a tribal/caste village based on village survey. **10 hrs**
3. Formulation of a model plan for development of a village through survey. **15 hrs**
4. A case study on application of any participatory model applied by any development agencies in the field level. **4 hrs**
5. Powerpoint presentation on any major rural/tribal issues. **2hrs**

IRTD 702: Extension Education-III (3+2=5)

Objectives:

This paper helps the students to familiarize with:

1. the different aspects of extension education and transfer of technology.
2. the activities of different agencies engaged in rural development.
3. the rural development activities of different branch centers of Ramakrishna Mission.
4. the rural development strategies and policies of selected countries.

Theory:

1. Fundamentals of Extension Education and Transfer of Technology (TOT): 15 hrs

Concept and types of TOT models – farmer back to farmer model, farmer first and farmer last model, farmer first model etc. **Extension training in transfer of technology, constraints in TOT agencies and departments involved in TOT, extension professional in TOT, TOT to resource poor farmers, PPP in TOT.** Human behavioral dimensions related to TOT models. Process of Transfer of farm technology, farming systems research, on- farm research, stages. Conceptual and philosophical similarities and dissimilarities among extension education, adult education and continuing education/ distance education.

Concept, characteristics, types; theories of rural leaderships, role of leader in successful implementation of rural development programme, key issues identified for improving extension services through farmer led extension.

2. Agricultural Journalism

10 hrs

Concepts of agricultural journalism and agricultural communication, agricultural Journalism as mean of mass communication, its forms and role in rural development programmes, opportunities, strength and limitation in India. Relation of press with government and society. Readability of literature, genesis of readability tests, clarity and brevity in writing. Principles and techniques of writing, news stories features, articles, magazine articles, farm bulletins and folders. Fundamentals of layout- various elements and their balancing, techniques of editing and publishing technical journals, research agricultural Journalism and its applications.

3. Different National and International Agencies and their rural development work:

10 hrs

CAPART, ICSSR, NIDH, CSWB, NISD, SC and ST Commission, NABARD, NIRD, NIPCCD, MYRADA, Tagore Society, CWS, European Union (EU), German Agro Action, ODA, Ford Foundation, UNICEF, UNESCO, UNDP, WHO, NORAD, MANAGE, NAARM, EEI, International Institute of Rural Development (IIRD).

4. Changing Policies in Rural Development:

5 hrs

Need for future rural development policy; goals of rural development policy; strategy for future rural development in India, areas of rural development, dimensions of rural development, indicators of development, MDG of United Nations.

5. Developmental Programmes:

14 hrs

Mandate, objectives and activities of Watershed development programme, Technology mission, National horticulture mission, NATP (National Agricultural Technology Mission), NAIP (National Agricultural Innovation Project), ATMA (Agricultural Technology Management Agency), Research- Extension-Farmer Interface, Privatisation of extension, Market lead extension, Production to consumption and End to End innovative approaches. Issues related to globalization and IPR. Programmes of ICAR – like IVLP (Institutional village linkage programme), KVK, Women in agriculture and their empowerment - improving women participation in extension and research, thrust areas. Commonwealth, FAO, DFID, CGIAR, USAID system. FLD and OFT in relation to TOT. NREGA, SGSY, MESO. National Rural Livelihood Mission, Food Security Mission, National Skill Development Mission.

Practical:

1. Identification of rural/opinion leaders through selected methods. **5 hrs**
2. Study of rural development programmes undertaken by Ramakrishna Mission Ashama, Ranchi in agriculture and allied activities, health and sanitation, literacy etc. and submit an analytical report. **5 hrs**
3. Visit to reputed rural development and agricultural development organization and critical analysis of its activities. **5 hrs**
4. To study the functioning of KVK with regard to TOT. **5 hrs**
5. Impact assessment of any livelihood improvement programme implemented in villages. **4 hrs**
6. Analytical report on the vision for future rural development in India. **4 hrs**
7. **Designing and layout preparation of cover design for farm magazine, folders etc. and laying of marital process of printing extension literature. New collection and report writing magazine features articles and scripts for techniques folders, technique of pre-testing readability. Each student select one team of publication and produce dummy design layouts.** **6 hrs**

IRTD 703: Advanced Horticulture (3+4=7)

Objectives:

This paper helps the students to familiarize with:

1. the principles, issues and management practices in farming system and sustainable agriculture..
 2. the importance and production packages for different spices, medicinal and aromatic plants.
 3. marketing and preservation techniques of fruits, vegetables and flowers and value addition of fruits and vegetables.
 4. the protective cultivation of different horticultural crops and seed production techniques including hybrid seed production.
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Theory:

1. Seed production technology and agronomical practices for important horticultural crops. 5 hrs

Definition, characteristics of quality seeds, different classes of seeds (nuclear seed, breeder seed, foundation seeds, registered seed, certified seed and truthfully labelled seed); seed production methodology with agronomical practices (location and season, selection of land, isolation distance for different crops, rouging for seed production in different crops, harvesting, threshing and processing, quality assessment and seed standard, labelling, drying, packaging, storage and transportation).

2. Technology for Rainfed and Dryland Horticulture: 2 hrs

Definitions (rain fed, dry land and dry farming), problems of dry land agriculture, plant adaptations to drought, strategies for dry land agriculture, Selection and cultivation of high value / remunerative crops; Principles and practices of dry land fruits and vegetables cultivation (moisture conservation techniques, control of water losses from plant and ground surfaces).

3. Horticultural Crop Production technology according to land situation. 2 hrs

(a) Lowland and irrigated upland; (b) Rain fed upland (contingency crop planning for Chotanagpur plateau regions); agronomy of rain fed upland farming, agronomical practices for irrigated medium and low land situations.

4. Production technology of spices and condiments of Eastern India. 5 hrs

(a) Selection of varieties; (b) Good agronomical/agricultural practices; (c) Good harvesting practices; (d) Plant protection; (e) Economic importance; (f) storage/post harvest practices etc. of ginger, turmeric, coriander, black pepper, large cardamom etc.

5. Cultivation of selected medicinal & aromatic plants including extraction procedures. 10 hrs

I) (a) Selection of varieties; (b) Good production packages; (c) Good harvesting practices; (d) Plant protection; (e) Medicinal importance; (f) Extraction procedures of alkaloids/medicinal properties etc. of ghritkumari (*Aloe*), ashwagandha, bhringaraj, cinchona, datura, kalmegh, safed musli, stevia etc.

II) (a) Selection of varieties; (b) Good production packages; (c) Good harvesting practices; (d) Plant protection; (e) Commercial importance; (f) Extraction procedures of aromatic oils/components etc. of jasmine, khus, lemon grass, mint, palmarosa etc.

6. Concept of high density orcharding and related practices. 2 hrs

High density planting-concept, types; Present Scenario in HDP in different fruit crops: Temperate, tropical, sub-tropical fruits and some plantation crops under HDP; **Constraints in adoption of HDP systems.**

7. Principles and construction of green houses along with protective cultivation of selected vegetables/flowers. 4hrs

(a) Green house construction; Greenhouse types, Structural Materials; Location; Control of Environmental Systems; Principles of green houses; Major Advantages of Greenhouses.

(b) Cultivation package of selected high value crops (fruits, flowers and vegetables) under green house conditions (strawberry, tomato, anthurium etc.).

8. Hybrid seed production techniques of annual horticultural crops. 8 hrs

(a) Hybrid seed production methods for self pollinated crops; (b) Hybrid seed production methods for cross pollinated crops; (c) Utilization of male sterility and self-incompatibility for hybrid seed production; (d) Problems associated with hybrid seed production by utilizing unisexuality, male sterility and self-incompatibility; (e) Maintenance of male sterile and self-incompatible lines.

9. Processing and marketing of fruits, flowers and vegetables. 7 hrs

(a) Processing of fruits and vegetables: heat preservation; low temperature preservation and processing; processing and preservation by removing moisture; preservation by food additives; preservation by fermentation; preservation and processing by cold sterilization and irradiation.

(b) Marketing of fruits, flowers and vegetables: Agricultural Marketing; Grading and Standardization; Diversity in Vegetable Marketing; Fruits, Vegetables and flowers Marketing in India; Cut flower marketing and export from India.

10. Post harvest management technology and value addition to fruits, flowers and vegetables. 7 hrs

(a) Post harvest management of fruits and vegetables: Curing, de-greening, pre-cooling, washing and drying, dis-infestation, post harvest treatments, waxing, control of ripening process, ripening of fruits, pre-packaging in plastic films, packaging, pelletization, transportation, irradiation and storage.

(b) Post harvest management of flowers: causes of deterioration of harvested flowers (growing condition, mechanical injury, bacterial and fungal infections, plugging of xylem vessels of cut flowers, moisture content, water quality, ethylene gas, heat damage etc.); factors affecting post harvest life of flowers (stage of harvesting, water relations, respirations, RH, GR, preservative solutions, pre-cooling and storage, packing and transportation etc).

(c) Value addition to fruits and vegetables: drying; freezing; unfermented beverages (juice, squash, jam, jelly and marmalade etc.), pickle; sauce/ketchup; potato chips/wafers etc.

11. Precision Farming in Horticulture. 2hrs

Definition, concepts, related practices.

PRACTICAL.

1. Determination of soil pH, organic carbon, available N, P, K in soils. Computation of economic and yield optima.

2. Methods of Seed quality testing (Physical and germination test); detasseling and familiarization with seed processing equipments

3. Horticulture crop based farming system study around the nearby villages of IRTDM

4. Visit and study of an aromatic oil extraction plant.
5. Identification and practices in cultivation of important spices and condiments.
6. Layout of ornamental gardens.
- 7. Formulation of ideal kitchen garden module for plateau region.**
- 8. ITK practices for crop regulation in different fruit crops.**
- 9. Nursery practices under protective structures.**
- 10. Standardization of organic agro-techniques for some important horticultural crops.**
- 11. Preparation of Jam, Jelly, Marmalade etc.**

IRTD 704: Research Methodology (3+3=6)

Objectives:

This paper helps the students to get acquainted with:

1. the basics of research methodology.
 2. the different qualitative methods and approaches of research.
 3. the quantitative techniques of data analysis.
 4. the simple software packages for the research.
-

Theory:

1. Aim and concepts related to Research:

4 hrs

Definitions, Characteristics, Objectives, and Types –Qualitative and Quantitative. Scientific research vs. Commonplace explanation. Approach, Method Methodology and Techniques. Fact, hypotheses and theory.

2. Qualitative Methodology:

15 hrs

Historical background, What Are Qualitative Methods? Distinction from quantitative research, data collection in qualitative research, qualitative validity, Underlying Principles, Contributions of Qualitative Research, advantages and challenges (8 hrs). Tools of data collection and analysis – Qualitative interviews – components and types. Observation – components and types. Case studies – types and usefulness (8 hrs). Qualitative assessment, Qualitative approaches - Cognitive, Existential, Grounded Theory (GT) - concept, stages of analysis, goals of GT, validity. Self-reflexion, Content analysis – concept, use, process. phenomenography, Discourse analysis, Critical theory, ethnomethodology (8 hrs).

3. Quantitative Methodology:

20 hrs

Psychometry, Scaling techniques - Concept, types and usefulness. Sociometry - definition, usefulness, sociogram analysis. Different Human Development Indices (HDI) – Dimensions, calculation, indicators, ranking of different countries, brief outline of state human development report in India (10 hrs). Special statistical tools and techniques like PATH analysis. Sampling and statistical testing, Probability and Probability distribution, different specialized research softwares like SPSS, STATA *etc.* (10 hrs). **Test of Hypothesis - its testing like z-test, t-test etc., Test of Significance.**

4. Research Process:

15 hrs

Research Design Types of Research Descriptive, Diagnostic and experimental Sampling: Types of Sampling, Probability Sampling Simple random, Stratified Random, Systematic Cluster, Multi Stage and Multi Faceted Non-Probability Sampling Convenient, Purposive, Quota, Snow Ball, Judgement (5 hrs). Tools of Data Collection: Case Study, Questionnaire, Interview Schedule, observation etc. Data Analysis:

Classification, Coding, Editing, Tabulation, Diagrammatic and Graphic Representation, Interpretation and Report Writing: Aims, Types, Format, Language; Concepts: Abstract vs. Review, References vs. Bibliography, Preparation of Manuscript (5 hrs).

Practical:

1. Preparation of layout for RBD, CRBD, LSD, factorial experiments and split plot design.
2. Test of significance: t-test, F-test and z-test
3. Correlation (simple, multiple, partial and rank) and regression analysis.
4. Operation of excel sheet.
5. Non-parametric test: Chi square test (for social survey).
6. Techniques of constructing socio-gram and its analysis.
7. Calculation of different indices of Human Development.

IRTD 705: Rural Living and Learning Experience (RLLE)-I (0+3=3)

OPTIONAL COURSES

IRTD 706: Human Resource Development and Management (3+2=5)

Objectives:

This paper helps the students to familiarize with:

1. the basics of human resource development and management
2. the importance and application of organizational behavior in HRD.
3. the management and acquisition of manpower
4. the process of developing rural human resources.

Theory:

1. Human Resource Development (HRD):

10 hrs

Philosophy of HRM, concept of HRD, Functions of HRD Development of Human as 'Total Quality Man', Concept of 'Human as resource', Importance, Evolution, Functions, Organisation of HRD functions. Present status of human resource in India, Role of Human Resource Development (HRD) in sustainable rural development, National Institutes for HRD.

2. Management :

10 hrs

Meaning and concept of management, performance appraisal, functions of performance appraisal, types of appraisal, Training and development, Quality of worklife, Career planning, Quality circles, Stress Management, Time Management, Total Quality Management, ISO 9000, Empowerment, Business Process Reengineering, Training programmes for workers, Management development programmes, Evaluation of training.

3. Organisational Behavior:

10 hrs

Concept, importance, role, evolution, Group behaviour and Decision-making, Leadership and Policies, group dynamics, Inter-group relations T-group, Team building, Survey feed back. Organizational Structures and Design, Organization life, Cycle and Design Organizational culture, organizational change and development, organizational effectiveness.

4. Personnel Management:

15 hrs

Functions, structure of personnel department, manpower planning, sub-systems of personnel management, acquisition of manpower, job evaluation, job specification, recruitment and selection, interview process, composition of the selection board, wage and salary administration, job evaluation, grievance handling and disciplinary action, new challenges.

5. Rural Human Resource Development:

9 hrs

Human resources and their importance in agricultural development. Training – Processes (Capacity building), Phases of training, developing training modules, guidelines for module preparation, designing training modules, training requirement, training needs assessment and training methods like role play, sensitivity training, project assignment, fish-bowl etc. Experiential learning techniques such as sensitivity training, transactional analysis and fishbowl exercise. Experiential learning cycle (ELC) model of training.

Practical:

1. Write a “State of the Field” paper that
 - i) provides a review of core issues facing HRD today,
 - ii) offers your perspective on these issues, and
 - iii) describes how your perspective fits with the context of your own organizational/societal setting, or an organizational/societal setting with which you are familiar.

 2. Select a topic of your interest from the course. Ideally, this should be one that relates to your experience. Your approach can take the form of critiquing existing HRD practices or interventions in rural/tribal areas. Your paper should contain a thorough discussion of the issue including:
 - i) The key ideas and concepts involved.
 - ii) Alternative positions and your own thinking on the issue
 - iii) Implications for practice

 3. Design a training module and schedule for capacity building on any issues relevant for the rural/tribal areas. Your module should contain,
 - i) Issues and Concepts.
 - ii) Requirements and methods
 - iii) Outcome of the training.

 4. Assessment of need and skill of the people of any rural or tribal area for their development. This must include selection of area, preparation of schedule, data collection, interpretation and recommendations.
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SEMESTER - VIII

IRTD 801: Indian Cultural and Spiritual Heritage (2+0=2)

1. Some selected lectures of Swami Vivekananda from Colombo to Almora
 - a) My plan of campaign,
 - b) Future of India,
 - c) Vedanta and its application to Indian life

15 hours
 2. Some selected letters of Swami Vivekananda on regeneration of rural India

12 hours
 3. Ramakrishna Math and Ramakrishna Mission and its Rural Development activities: Aims, objectives, motto, emblem, philosophy, history, organizational structure/ network, replicability. Rural development activities of Ramakrishna Mission with special reference to Lokashiksha Parishad of Narendrapur, Samaj Sevak Sikshan Mandir of Saradapith, Divyayan Model of Ranchi, Narainpur of Chhatrisgarh etc: **6 hrs**
 4. Related topics to be selected by the concerned teacher

3 hrs
- Note: Unit tests include written test, PP presentation and/ or speech on some selected topic, assignment etc

IRTD 802: Integrated Farming System Technologies (3+4=7)

Objectives:

This paper helps the students to get acquainted with:

1. the basics of integrated farming systems.
2. the different integrated management technologies of plant nutrient, pest, disease, weed, water etc.
3. the certification of organic products.
4. the economics of integrated farming system.

Theory:

1. Water Management technology in cropping system.

Concept, need for sustainable water management, hydrologic cycle, global water scenario, diverse use of water, water budget in India, soil moisture and groundwater recharge, irrigation development, national water policy- strategy and implementation, participatory irrigation management, environmental impact assessment of irrigation projects.

10hrs

2. Integrated Plant Nutrient Management technology in cropping system. **3 hrs**

Concept, definition, need , major nutrient management issues, components of INM, nutrient uptake and removal, different nutrients – resistance and susceptible to different diseases. INM of major field crops – cereals, pulses, oilseeds etc.

3. Integrated Management of Pests and Diseases in cropping system.

Introduction, place of IPM in sustainable development, basic component of IPM, IPM of rice, chickpea, mustard, cauliflower, cabbage, groundnut, ginger, okhra, brinjal, tomato, capsicum etc. Concept of ETL and EIL, pest resurgence and resistance mechanism. Weather agronomic practice and effect on disease in different cropping systems of Jharkhand.

10 hrs

4. Integrated weed Management technology- concept and its application.

Definition and concept of weeds, Classification of weeds, Characteristic features of weed, Harmful and beneficial effects of weeds, Persistence of weeds, Survival mechanism of weeds, weed management: Why should we be concerned about weeds, Essence of Noxious Weed Management, Weed Management Strategies, Methods of weed control: Preventive measures, Eradication methods, Control methods: mechanical, chemical and biological along with their merits and demerits; Herbicides: Classification, formulation and their different types; Persistence of herbicide in soils, Integrated Weed Management: Why an integrated approach is important, General principles, strategies, crop specific examples of IWM and advantages of IWM. **12 hrs**

5. Strategy for sustainable Agricultural Development.

Concept/ Themes; Plant Production Practices under Sustainable Agriculture; Animal Production Practices under Sustainable Agriculture; Strategies for Sustainable Agriculture. **3 hrs**

6. Farming System Approach for sustainable agricultural development.

Farming system concept and Scope; Agricultural productivity improvement through farming system approach; Farm Production Systems; Farming System Approach and Fertiliser Industry; Sustainable Rice Production through Farming Systems Approach. **4 hrs**

7. Integration of crop, livestock, forestry and other allied enterprises – Integrated farming system model.

Integrated farming systems- profitability and sustainability; Objectives of integrated farming systems; Goal and components of IFS; Food and fodder security through integrated farming system approach; Integrated Agro-forestry system; Integration of different Enterprises in IFS; IFS under different agro ecosystems, Land Reclamation and Integrated Farming System; Constraints of IFS. **8 hrs**

8. Certification, export, marketing of (organic products) any produce/products coming out of IFS.

What is organic Agriculture? Why organic? Organic Farming Techniques Can Increase Antioxidant Content; Status of organic products in India: Organic products [National Programme for Organic Production (NPOP)], production and export of organic products in India; Organic Standards: accredited certification bodies under National Programme for Organic Production; Process for organic certification: Steps for INDOCERT Certification; FAQ regarding organic farming and organic certification; Organic crop cultivation techniques: Coriander, Chilli, Garlic, Ginger. **10 hrs**

9. Integrated Farming System (IFS) based on land holding and under rain fed and irrigated eco-system.

10. Economics of IFS.

Practical:-

1. IPM module application on any two available vegetable crops. **15 hrs**
 2. Identification and preservation of some major beneficial and harmful insects and diseases of crops from field. **5 hrs**
 3. Identification of important weeds of different crops. **10 hrs**
 4. Preparation of weed herbarium. **10 hrs**
 5. Preparation of spray solutions of herbicides for high and low volume spray. **15 hrs**
 6. Basic analysis of soil and water in IFS. **25 hrs**
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IRTD 803: Planning, Policy and Panchayati Raj Institution (3+2=5) [Compulsory for REM]

Objectives:

This paper helps the students to familiarize with:

1. the background and techniques of different types of planning.
 2. the different policies and programmes related to rural development.
 3. the aspects of local organisation and its functions.
 4. the role of different grass root level agencies in rural development.
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Theory:

1. Planning:

Definition, Background of Indian planning, statutory bodies of planning, overview of development planning, models of development planning. Techniques of planning- Detail steps in district, block and village level planning, Area Development Planning: Definition, purpose, Area development plans. Planning for PRIs. State control over PRIs. **10 hrs**

2. Policies and Programs:

Aims, objectives and action plan of National Agricultural policy, Health and family planning policy, Education policy, Environmental policy, Population policy, Employment policy, Policies for alleviating poverty etc. Different ongoing rural development programme in a nutshell. **15 hrs**

3. Administrative Structure:

Bureaucracy, structure of administration; Panchayati Raj Institutions and Voluntary Agencies: Functions of government and non-government organizations for rural development; Agricultural Extension Services; Emergence and Growth of Panchayati Raj Institutions in India; People and Panchayati Raj; Financial Organizations in Panchayati Raj Institutions; Devolution of finance and power (11th Schedule); Generation and Mobilization of rural finance (revenue); Interface in Panchayat System Relevance of interface in sustainable development of State; Interfaces - Panchayats and Govt. Officials; Government & Non-Government Organizations / Community Based Organizations – characteristics, types of NGOs, advantages of NGOs over govt. organization, role of NGOs in rural development, functions of some important NGOs, Programme implementation through Society approach like JSLPS, JTDS etc. **15 hrs**

4. Local organisation and its functions:

Genesis, growth and diversification. Gram Sabha, Gram Panchayat, Taluka/Block Panchayat, Zilla Panchayat, Training and awareness generation – concept, limitations, training process, training programme implementation, new concepts of training, micro-lab, farmer's participation. People's participation – definition, participation and social change, typology of participation, participation in the context of rural development, obstacles in participation, participatory technology development. Women empowerment – elements, empowerment issues, key principles, national policy for the empowerment of women 2000, strategies for empowerment, measurement of empowerment. **10 hrs**

5. Aspects of Local administration:

Financial administration – levels of financial administration, principles, requirements for financial administration. Personnel administration – objectives, characteristics, some dis-functionalities, evolving and efficient personal system. Programme administration– objectives, characteristics, some dis-functionalities.

6. Market led extension-emerging perspectives;-issues and challenges and dimensions

Practical:

1. Attend a 'Gramsabha' and prepare a report.
 2. Visit a Panchayat Office to study its functioning as a local administrative body.
 3. Visit and study on traditional tribal village administration.
 4. Study of programme implementation procedure through PRI.
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IRTD 804: Information and Communication Technology (ICT) in Rural Development (3+3=6)

This paper helps the students to get acquainted with:

1. the basics of ICT and its role in rural development.
 2. the knowledge of different ICT enabled rural services.
 3. the idea of geographical information system.
 4. the aspects of agricultural information system.
-

Theory:

1. Information and Communication Technology:

Definition and meaning of information, information as a strategic resource, changing conceptions of information and information systems. Concepts, approaches and types, principles and fundamentals of computers, networks, and peripherals as tools to understand the applications and limitations of computer technology, search processes and data retrieval using search engines, downloading, uploading, Networking (Hardware, Software, Connectivity, LAN, WAN, Internet), troubleshooting (Hardware, OS, Security), development of simple web sites using HTML, XML, and tools. **15 hrs**

2. Agricultural Information Systems:

Concepts and notations of Unified Modeling Language (UML), uses to construct models, types of information systems, data collection and recording methods, visual modeling and UML, identification of actors, use cases, activity diagram, identification of classes, relationships, behavior and structure, inheritance, analyzing object behavior, designing the system architecture, domain specific model to enable rapid implementation of new, industry-specific applications over diverse platforms, agricultural information systems: current situation and perspectives in India, development of ontology, and multi-lingual framework. **15 hrs**

3. ICT enabled Rural Services:

Introduction to various ICT enabled rural services related to land, education, health, insurance, micro-credit, marketing etc. Village Resource Centre (VRC), Common resource Centre (CRC), Tele-education, community radio etc. Existing delivery models and issues to conceptualize platform(s) for ICT enabled delivery systems, Issues in connectivity. Case studies - Drishtee, Aksh, n-Logue, ITC's e-Choupal, TARAhaat, Akshaya etc. Designs of delivery systems. **15 hrs**

4. Overview of Geographical Information Systems (GIS):

Remote Sensing and Image Processing, GPS, GIS Data Modeling, Geographical Information Systems, Issues and Concerns in Land and Water Management, The GIS Approach. Planning and Implementing a GIS; Case studies on GIS; GIS and Precision farming; GIS Applications in micro resource mapping, principles in micro planning, modeling in resource mapping GIS Technology trend and next generation Systems.

Practical:

1. Creation of extension blogs.
2. Report preparation on e-choupal and ICT enabled services.
3. Manual mapping during field operation.
4. Study and report preparation on Geographic Information System information from secondary source.
5. IT tools for GIS.

IRTD 805: Learning through Organisational Attachment (LOA) (0+7)

IRTD-811: Protected Cultivation of High Value Crops (3+2) [Compulsory for ASL]

Theory

Protected cultivation- importance and scope, Status of protected cultivation in India and World types of protected structure based on site and climate. Cladding material involved in greenhouse/ poly house. Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management. Types of benches and containers. Irrigation and fertigation management. Propagation and production of quality planting material of horticultural crops. Greenhouse cultivation of important horticultural crops - rose, carnation, chrysanthemum, gerbera, orchid, anthurium, liliun, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, *etc.* Cultivation of economically important medicinal and aromatic plants.

Off-season production of flowers and vegetables. Insect pest and disease management.

Practical

Raising of seedlings and saplings under protected conditions, use of protrays in quality planting material production, Bed preparation and planting of crop for production, Inter cultural operations, Soil EC and pH measurement, Regulation of irrigation and fertilizers through drip, fogging and misting.

OPTIONAL COURSES

IRTD 806: Agribusiness Management (3+2=5)

Objectives:

This paper helps the students to get acquainted with:

1. the introduction to agri-business management.
 2. the different financial aspects of agri-business management.
 3. the issues like intellectual property rights, business ethics, marketing in relation to agri-business.
 4. the management procedures of different agro-based industry.
-

Theory:

1. Introduction to Agri-business Management:

Concepts of industry and firm, enterprise, resources of an enterprise *for entrepreneurial development*, importance of various resources, scarcity of resources, utilization of resources. Types of agri-business, world scenario, Indian scenario, various agencies involved, WTO on agri-input industries, changing strategies of agri-input sector. Government policy, taxes and subsidies, EDP for agribusiness. **15 hrs**

2. Financial management of agri-business:

Financial resources of an organization, importance and need for financial resources, agri-business financial management, role of the financial manager, recording agri-business transaction. Accounting – definition and meaning, users of accounting information, the accounting equation. **15 hrs**

3. Marketing aspects of Agribusiness:

Importance, scope, marketing concepts, variables of marketing, market segmentation and targeting, marketing planning process, consumer market and consumer behaviour, market forecasting, pricing of the product, various pricing strategies, various channels, marketing channels and functionaries, market functions direct and on-line marketing, internet based system (AGMARKNET), market information system export-import policy, agricultural price policy, agricultural market intelligence, marketable surplus, Intellectual Property Right (IPR) issues related to Agri business Management, business ethics, special provision for agricultural export-import promotion. **20 hrs**

4. Management of Agro-based Industry:

Introduction, classification, by-products utilization, management of agro-processing industries, fertilizer industry, pesticide industry, seed industry, food processing industry, livestock industry, horticulture based industry, poultry industry.

Practical:

1. Study of functioning of any agro-based industry.
 2. Study and functioning of various institutional agencies financing agro-based industries.
 3. Study of consumer behavior and their attitudes in taking purchase decisions.
 4. Various packaging materials used for agro-based products.
 5. Preparation of profit and loss statement.
 6. Development of Agri- Business plan and preparation of marketing strategy.
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SEMESTER-IX

IRTD 901: Indian Cultural and Spiritual Heritage (2+0=2)

Objectives:

This paper helps the students to get acquainted with:

1. the concept of service and its explanation from different viewpoint.
 2. the eternal glory of India and her future.
 3. the Swamiji's view on social reforms.
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1. Difference between Service and Charity, Types of Service, Gradation of Service, Why should we serve others? A. Practical Reasons B. Scientific Reasons Biology, Physics, C. Ethical Reasons D. Religious Reasons – Islam, Christianity, Hinduism E. Philosophical Reasons
2. Philosophy of Service: Service of God in Man and Karma Yoga
3. India: Her Eternal Glory, Her Life Center, Causes for the decay of India, Regeneration of India and Her Future
4. Swamiji's view on Social Reforms, Condition of the masses and ways for their uplift, Condition of the Women and ways for their uplift, Social evils and their eradication, All round development of the society, Swami Vivekananda on Organization, Qualities of a successful reformer
5. Related topics to be selected by the concerned teacher

IRTD 902: Rural Entrepreneurship Development (3+2=5)

Objectives:

This paper helps the students to get acquainted with:

1. the concept of entrepreneurship and its relevance in rural development.
 2. the different programmes of entrepreneurship development.
 3. the different institutions supporting entrepreneurs.
 4. the policies of government and selected success stories.
-

Theory:

1. Entrepreneurship: Concept of Entrepreneurship, origin and Development of Entrepreneurship; Entrepreneurship Movement in India, role of entrepreneurship in economic development. **6hrs**
2. Rural Entrepreneurship: Meaning of rural entrepreneurship, need for rural entrepreneurship, problems of rural entrepreneurship, NGOs and rural entrepreneurship, Training and Development of rural Entrepreneurs. **6hrs**
3. Entrepreneurship Development Programmes (EDPs): Need for EDPs, Objectives of EDPs, Course content and curriculum of EDPs, Phases of EDPs, Evaluation of EDPs. Project Identification and Selection, Project Formulation and Appraisal. **6hrs**
4. Agencies Supporting Entrepreneurs: District Industries Centre (DICs), Micro, Small and Medium Enterprise (MSME) KVIC, National Small Industries Corporation (NSIC), Small Industries Development corporation (SIDC), Small Scale industries Board (SSIB), State Small Industries Development

Corporations (SSIDC), Technical Consultancy Organisations (TCOs), National Bank for Agricultural and Rural Development (NABARD) etc. **15 hrs**

5. Financial Institution for Entrepreneurs: Commercial banks, Industrial development bank of India (IDBI), Industrial Finance corporation of India (IFCI), Industrial credit and investment corporation of India (ICICI), Industrial reconstruction bank of India (IRBI), Unit trust of India (UTI), State financial corporations (SFCs), Export-Import bank of India (EXIM bank), Small Industries Development Bank of India (SIDBI) etc. **12 hrs**

6. Government Policy: Entrepreneur Development Programme, Self-employment Programmes, Entrepreneurship in self employed with and without SHGs, Social Audits, government support to small-scale enterprises during five year plans. **10 hrs**

7. Case Studies: Selected case studies on some greatest entrepreneurs (both men and women) of India.

Practical:

1. “Entrepreneurship does not emerge spontaneously”.
How would you justify the statement?
(Spontaneously / after training / after experience/ self-motivated)
2. Draw a Model Scheme for training and development of rural entrepreneurs.
3. Visit any N. G.O and study entrepreneurial activities and prepare a report.
4. Visit National Bank for Agricultural and Rural Development and observe its role in developing rural entrepreneurs.
5. Prepare a Project for:
 - a. Rural self-employment programme.
 - b. Self-help group.
 - c. Small scale enterprise in rural tribal area.
6. Case Study: - Life of any Successful rural entrepreneur (man or women) Write a full report on that.
7. “Rural entrepreneurship symbolizes rural industrialisation which tackle twin problem of unemployment and poverty” – Justify the statement citing appropriate field study.

IRTD 903: Production Economics and Farm Management (3+2=5)

Objectives:

This paper helps the students to get acquainted with:

1. the concept of production economics and its related aspects.
 2. the issues of farm management in the Indian context.
 3. the tools of farm management.
 4. the different aspects of farm resource management.
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Theory:

Theory:

1. Theory of demand, demand schedule and curve, market demand, law of return, law of diminishing marginal return, law of supply- supply schedule, supply curve elastics, market equilibrium, price determination and forecasting and various market structures. **10 hrs**
2. Production Economics: Concept and Meaning of production economics, objectives and language of production economics, production function, types of production function, regions of production function, impact of technological changes on production function. **15 hrs**

3. Farm Management: Definition, scope and importance. Farm management in India, nature and characteristics of farm management science, relationship with other sciences, problems in farm management in Indian context, development of farm management science in India. **15 hrs**

4. Tools of Farm Management: Farm planning, objectives of farm planning, characteristics of a good farm plan, techniques of farm planning, information needed for planning and budgeting, steps in farm planning and budgeting. **12hrs**

5. Management of Farm Resources: Land management, Soil management, Irrigation, management of Labor, farm machinery management, management of financial resources, risk and uncertainty loss assessment.

Practical:

1. Drawing demand and supply curve under different market prices.
 2. Determination of market price under different demand and supply conditions of a commodity.
 3. Calculation of marginal product, average product etc.
 4. Layout of a model farm.
 5. Preparation of a cropping sequence of a farm.
 6. Estimation of labor requirement of a farm.
 7. Visit of a farm to study the farm records and management system.
 8. Related assignments- Loss assessment of a crop.
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IRTD 904: Rural and Tribal Development and Management (3+2=5) [Compulsory for REM]

Objectives:

This paper helps the students to get acquainted with:

1. the introduction to the management and organizational development.
 2. the different aspects of project formulation and management.
 3. the different criteria of project evaluation.
 4. the process of draft project preparation and its social valuation assessment.
-

Theory:

1. Management: meaning and concept, its relevance in development and organization; Process of management, challenges of management in development work, changes in management thoughts; Management type: Functional management, Participation management, role of managers in participation management, role of participants; Traditional management versus participation management. **10 hrs**

2. Organizational development: Meaning and assumption of organizational development, Value system concept, structure and design, value-based organizational development; Management of extension Organizations: concept, planning, organizing, staffing, training methods, leading, controlling. **10 hrs**

3. Project Formulation and Management: Elements of Project Formulation; Micro plan for individual beneficiary / group; Goal, Objective, Problem; Strategy and Formulation; Budgeting; Log frame / Project Planning Matrix; Plan of Implementation/ Operation: Project Management: Monitoring, Evaluation and Follow up; Programme implementation, Financial Management, Monitoring: Objectives and methods. **12 hrs**

4. Project Evaluation: Criteria for Project Evaluation and Decision Rules: Pay-Back Period Method, Net Present Value Method, Internal Rate of Return; Cost -Benefit Ratio; Before and After Project Situation; With and Without Project Situation; Participatory Evaluation Process. **14 hrs**

5. Social Valuation of Costs and Benefits of a Project; Detail steps in Social Cost-Benefit Analysis with case studies; Coordination: meaning and concept; Nature of coordination; importance of coordination in rural development programme management.

Practical:

1. Draft a project on the following schemes (any two): -
 - a) Water Shed in Rural Tribal area.
 - b) Self help group scheme.
 - c) Development of Agro-based industry in Tribal Locality.
 - d) Development of Rural Infrastructure etc.
2. Visit any medium sized Industrial Organisation to study Functional management.
3. Draw and describe the development of any organisation through **Value System** concept.
4. Determine the working Capital utilising following information-
Plant- Rs. 250000, land Rs. 10,00,000/- Machinery Rs. 3,50,000/- Electric motors – Rs. 2,00,000, Electrical fitting, Rs. 1,00,000/- cash at Bank, Rs. 75,000/- Raw material (stock), Rs. 2,00,000/- Long term loan, Rs. 5,00,000/- Short term loan, Rs. 2,00,000/- Electricity bill, Rs. 50,000/- commission payable to selling agents, Rs. 1,15,000/-, E. S. Payment (due), Rs. 1, 50,000/-
[or of other related data]
5. Analyse in details **social cost benefit** with help of case study (e.g. School infrastructure, Sanitation, Road, Health care, Electricity etc.).
6. Study the **nature of Coordination** in any rural development programme management.
[i.e. Coordination of Human resources (HRD) with the material resources . Combining factor is = Organisation]

IRTD 905: Rural Living and Learning Experience (RLLE)-I (0+3=3)

IRTD-906: Bio-pesticides, Bio-agents & Bio-fertilizers (3+2) [Compulsory for ASL]

Theory

History and concept of bio-pesticides. Importance, scope and potential of bio-pesticide. Definitions, concepts and classification of bio-pesticides viz. pathogen, botanical pesticides, and biorationales. Botanicals and their uses. Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomopathogenic pathogens and nematodes. Methods of application of biopesticides. Methods of quality control and Techniques of biopesticides. Impediments and limitation in production and use of biopesticide.

History and concept of biological controls. Importance, scope and potential of biological control in crop management. Definitions, concepts and classification of bio-agents. Techniques of biological control, Mass production technology of bio-agents.

Biofertilizers - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- *Azospirillum*, *Azotobacter*, *Bacillus*, *Pseudomonas*, *Rhizobium* and *Frankia*; Cynobacterial

biofertilizers- *Anabaena*, *Nostoc*, *Hapalosiphon* and fungal biofertilizers- AM mycorrhiza and ectomycorrhiza. Nitrogen fixation -Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization. Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertilizers. FCO specifications and quality control of biofertilizers. Application technology for seeds, seedlings, tubers, sets etc. Biofertilizers -Storage, shelf life, quality control and marketing. Factors influencing the efficacy of biofertilizers.

Practical

Isolation and purification of important biopesticides: *Trichoderma* *Pseudomonas*, *Bacillus*, *Metarhizium* etc. and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities in field condition. Quality control of biopesticides.

Method of production and field application of different bio-agents.

Isolation and purification of *Azospirillum* , *Azotobacter*, *Rhizobium*, P-solubilizers and cyanobacteria. Mass multiplication and inoculums production of biofertilizers. Isolation of AM fungi -Wet sieving method and sucrose gradient method. Mass production of AM inoculants.

OPTIONAL COURSES

IRTD 907: Financial and Accounting Management (3+2=5)

Objectives:

This paper helps the students to get acquainted with:

1. the basic concept of accounting.
2. the process of financial management.
3. the aspects of importance of financial planning.
4. the essentials of profit planning.

Theory:

1. Accounting: Definition and meaning, users of accounting information, the accounting equation reasons for financial information system, financial transaction, book keeping, accountant, works of an accountant, use of accounting in management, accounting in business, accounting in everyday life, data processing in accounting, starting an accounting system. **20 hrs**

2. Accounts: Classification of commonly used accounts, personal account, real account, nominal account, debit and credit, the double entry system, advantages and disadvantages of double entry system, recording transactions, business transactions, journals and ledgers, trial balance, basic accounting considerations, assets and liabilities, capital, goods, events, purchase, stock, debtors and owners, equity, revenue, cost of sales and net profit. **15 hrs**

3. Operating and incidental expenses, inventory, depreciation, accounting cycle. Income management, adjustment process, preparing financial statements from the adjusted trial balance. Preparing an income statement and balance sheet, profit and loss statement. **10 hrs**

4. Financial ratio analysis, users of financial analysis, nature of financial ratios- types of ratios. **5 hrs**

5. Financial planning, objectives of profit planning, essential of profit planning, types of budgets, preparation of profit plan or budgets.

Practical:

1. Preparation and maintenance of balance sheet.
 2. Preparation of a trading account, P& L account.
 3. Financial analysis and planning of a business.
 4. Journalisation of data & ledger maintenance, trial balance, profit and loss statement etc.
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IRTD-911: Project Management in Agricultural Development (3+2)

Theory

Introduction to Project Management: Basics of Project Management, Project Life Cycle and its Classification, Project Management Process and Project Selection, Technical Feasibility

Commercial and Financial Feasibility: Market Potential Analysis, Financial Feasibility, Project Financing, Financial Analysis, Risk Analysis.

Project Control Techniques: Project Control through Networks, Economic and Social Cost Benefit Analysis, Human Aspects in Project Management, Project Termination

Practical

Project Formulation, Project Evaluation and Preparation of DPR

SEMESTER – X

Module No	Title	Credit
IRTD - 951	Dissertation	0+27
IRTD – 952	Extension Education-IV	1+1
IRTD - 953	Rural Development Work Experience(RDWE)	0+3
		32

IRTD-951: Dissertation (0 + 27) = 27

1. **Seminar 1:** Presentation on Synopsis of Dissertation. 1
2. **Seminar 2:** Presentation on Progress of Research Work. 1
3. **Seminar 3:** Presentation on final findings of the Research Work. 1
4. Preparation of a research article based on dissertation findings for a Journal. 1
5. Dissertation write up, survey/ experiments, literature review, library work etc. 23

IRTD-952: Extension Education- IV (1 +1) = 2

1. Approaches of Agricultural Extension: A critical analysis of different approaches of agricultural extension. Importance and relevance of indigenous knowledge system, identification and documentation of ITK, Integration of ITK system in research formulation.
2. Changing scenario of agricultural extension at national level; Market led extension-issues and challenges and dimensions.
3. Recent Training Techniques for understanding and facilitation team building, group dynamics, motivation and empowerment, laboratory methods: micro-lab process work, and sensitivity training, psychological instruments as training tools: TAT, inventories, cases etc.
4. Participatory training techniques-Lecturette, Brainstorming, Group Discussion and Training, Role play, case analysis etc., Factors effecting training effectiveness and training evaluation.

IRTD-953: Rural Development Work Experience (RDWE) (0 +3) = 3

The students will be provided with the opportunities to visit and study the activities of Universities, state departments of agriculture and allied sectors, Krishi Vigyan Kendras, Banks, other Government and non-government institutions which are involved in different rural development activities. Students thus will acquire firsthand knowledge of all prevailing projects/programmes, their mode of implementation and different strategies involved to encounter the problems faced. This exposes the students to real life situations and gives them opportunities to apply in actual situations

- (a) concepts on integrated rural and tribal development,
- (b) different technologies based on agriculture and related fields and
- (c) management concepts learnt in class room situations.
