



**List of Courses Focus on Employability/ Entrepreneurship/
Skill Development**

Department : Rural Technology and Social Development

Programme Name : B.Sc. Rural Technology

Academic Year : 2016-17

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
1.	RT-102	Manures and Fertilizers
2.	RT-103	Laboratory Course (RT101+102)
3.	RT-107	Elementary Microbiology
4.	RT-109	Laboratory Course (RT107+108)
5.	RT-204	Goat and Pig Production Techniques
6.	RT-205	Dairy Management and Products
7.	RT-206	Laboratory Course (RT-204+205)
8.	RT-302	Poultry Production Techniques
9.	RT-303	Lac, Vermi and Apiculture Techniques
10.	RT-304	Laboratory Course (RT-302+303)
11.	RT-305	Mushroom Production Techniques
12.	RT-306	Sericulture
13.	RT-307	Laboratory Course (RT-305+306)
14.	RT-402	Land Surveying, Leveling and Drawing Techniques
15.	RT-403	Building Construction Materials
16.	RT-404	Laboratory Course (RT- 402+403)
17.	RT-406	Aquaculture
18.	RT-407	Laboratory Course (RT- 405+406)
19.	RT-409	Nursery Management Techniques
20.	RT-410	Laboratory Course (RT- 408+409)
21.	RT-501	Introduction to Remote Sensing
22.	RT-502	Laboratory Course (Based on RT-501)
23.	RT-503	Introduction to Medicinal Plants
24.	RT-504	Laboratory Course (Based on RT-503)
25.	RT-E-508	Computer and its Application for Rural Development
26.	RT-E-510	Entrepreneurship and Small Business Management
27.	RT-601	Sensor and Digital image processing in Remote Sensing

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)
Koni, Bilaspur - 495009 (C.G.)

28.	RT-602	Laboratory Course (Based on RT-601)
29.	RT-603	Ethnobotany and Indigenous Medicament
30.	RT-604	Laboratory Course (Based on RT-603)
31.	RT-605	Rural Infrastructure Engineering
32.	RT-606	Watershed Management
33.	RT-607	Laboratory Course (Based on RT-605+606)
34.	RT-E-608	Rural Health Care
35.	RT-E-609	Wooden Art
36.	RT-E-610	Dhokra Art



Scheme and Syllabus

DEPARTMENT OF RURAL TECHNOLOGY & SOCIAL DEVELOPMENT,
GURU GHASIDAS VISHWAVIDYALAYA

SEMESTER SCHEME as per CBCS
UG-PG INTEGRATED COURSE

B. Sc. I SEMESTER

Course Code	Course	Type of Course	Credit Distribution		Credit	Marks Distribution			Marks
			Lecture (L)	Practicals (P)		Theory	Sessional	Practical	
First Semester: 22 Credits (Core Course= 22 Credits)									
FH-101	Hindi Language	FC	2	-	2	30	20	-	50
FE-102	Communication and Study Skills in English	FC	2	-	2	30	20	-	50
RT-101	Fundamentals of Soil	CC	2	-	2	30	20	-	50
RT-102	Manures and Fertilizers	CC	2	-	2	30	20	-	50
RT-103	Laboratory Course (RT-101 +102)	CC	-	2	2	-	20	30	50
RT-104	Diversity of Fauna - I	CC	2	-	2	30	20	-	50
RT-105	Diversity of Fauna - II	CC	2	-	2	30	20	-	50
RT-106	Laboratory Course (RT-104 +105)	CC	-	2	2	-	20	30	50
RT-107	Elementary Microbiology	CC	2	-	2	30	20	-	50
RT-108	Elementary Cell Biology	CC	2	-	2	30	20	-	50
RT-109	Laboratory Course (RT-107+108)	CC	-	2	2	-	20	30	50
Total			16	06	22	240	220	90	550

CC= Core Course, FC= Foundation Course

B. Sc. II SEMESTER

Subject Code	Course	Type of Course	Credit Distribution		Credit	Marks Distribution			Marks
			Lecture (L)	Practicals (P)		Theory	Sessional	Practical	
Second Semester: 22 Credits (Core Course= 22 Credits)									
FH-201	Hindi Language	FC	2	-	2	30	20	-	50
FE-202	Communication and Study Skills in English	FC	2	-	2	30	20	-	50
RT-201	Anatomy and Physiology of Insects	CC	2	-	2	30	20	-	50
RT-202	Integrated Pest Management	CC	2	-	2	30	20	-	50
RT-203	Laboratory Course (RT-201+202)	CC	-	2	2	-	20	30	50
RT-204	Goat and Pig Production Techniques	CC	2	-	2	30	20	-	50
RT-205	Dairy Management and Products	CC	2	-	2	30	20	-	50
RT-206	Laboratory Course (RT-204+205)	CC	-	2	2	-	20	30	50
RT-207	Diversity of Cryptogamic Plants	CC	2	-	2	30	20	-	50
RT-208	Elementary Genetics and Plant Breeding	CC	2	-	2	30	20	-	50
RT-209	Laboratory Course (RT-206+207)	CC	-	2	2	-	20	30	50
Total			16	06	22	240	220	90	550

CC= Core Course, FC= Foundation Course

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B. Sc. III SEMESTER

Subject Code	Course	Type of Course	Credit Distribution		Credit	Marks Distribution			Marks
			Lecture (L)	Practicals (P)		Theory	Sessional	Practical	
Third Semester: 21 Credits (Core Course= 21 Credits)									
FE-301	Environmental Studies-I	CC	3	-	3	30	20	-	50
RT-302	Poultry Production Techniques	CC	2	-	2	30	20	-	50
RT-303	Lac, Vermi and Apiculture Techniques	CC	2	-	2	30	20	-	50
RT-304	Laboratory Course (RT-302+303)	CC	-	2	2	-	20	30	50
RT-305	Mushroom Production Techniques	CC	2	-	2	30	20	-	50
RT-306	Sericulture	CC	2	-	2	30	20	-	50
RT-307	Laboratory Course (RT-305+306)	CC	-	2	2	-	20	30	50
RT-308	Morphology and Anatomy of Phanaerogames	CC	2	-	2	30	20	-	50
RT-309	Plant Physiology and Biochemistry	CC	2	-	2	30	20	-	50
RT-310	Laboratory Course (RT-308+309)	CC	-	2	2	-	20	30	50
Total			15	06	21	210	200	90	500

CC= Core Course

B. Sc. IV SEMESTER

Subject Code	Course	Type of Course	Credit Distribution		Credit	Marks Distribution			Marks
			Lecture (L)	Practicals (P)		Theory	Sessional	Practical	
Fourth Semester: 21 Credits (Core Course= 21 Credits)									
FE-401	Environmental Studies-II	CC	3	-	3	30	20	-	50
RT-402	Land Surveying, Leveling and Drawing Techniques	CC	2	-	2	30	20	-	50
RT-403	Building Construction Materials	CC	2	-	2	30	20	-	50
RT-404	Laboratory Course (RT- 402+403)	CC	-	2	2	-	20	30	50
RT-405	Agricultural Microbiology	CC	2	-	2	30	20	-	50
RT-406	Aquaculture	CC	2	-	2	30	20	-	50
RT-407	Laboratory Course (RT- 405+406)	CC	-	2	2	-	20	30	50
RT-408	Economic Botany	CC	2	-	2	30	20	-	50
RT-409	Nursery Management Techniques	CC	2	-	2	30	20	-	50
RT-410	Laboratory Course (RT- 408+409)	CC	-	2	2	-	20	30	50
Total			15	06	21	210	200	90	500

CC= Core Course

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B. Sc. V SEMESTER

Subject Code	Course	Type of Course	Credit Distribution		Credit	Marks Distribution			Marks
			Lecture (L)	Practicals (P)		Theory	Sessional	Practical	
18 Credits (Core Course 14 Credits+ Elective Course 04 credits)									
RT-501	Introduction to Remote Sensing	CC	3	-	3	30	20	-	50
RT-502	Laboratory Course (Based on RT-501)	CC	-	1	1	-	20	30	50
RT-503	Introduction to Medicinal Plants	CC	3	-	3	30	20	-	50
RT-504	Laboratory Course (Based on RT-503)	CC	-	1	1	-	20	30	50
RT-505	Agricultural Equipments and Crop Production	CC	3	-	3	30	20	-	50
RT-506	Introduction to Horticulture	CC	3	-	3	30	20	-	50
RT-507	Laboratory Course (Based on RT-505 + 506)	CC	-	2	2	-	20	30	50
RT-E-508	Computer and its Application for Rural Development	EC	2	-	2	30	20	-	50
RT-E-509	Rural Energy Resources	EC	2	-	2	30	20	-	50
RT-E-510	Entrepreneurship and Small Business Management	EC	2	-	2	30	20	-	50
Total			16	04	20	180	180	190	450

CC= Core Course, EC= Elective Course; *Out of three elective papers any two elective papers may be chosen.

B. Sc. VI SEMESTER

Subject Code	Course	Type of Course	Credit Distribution		Credit	Marks Distribution			marks
			Lecture (L)	Practicals (P)		Theory	Sessional	Practical	
18 Credits (Core Course 14 Credits+ Elective Course 04 credits)									
RT-601	Sensor and Digital image processing in Remote Sensing	CC	3	-	3	30	20	-	50
RT-602	Laboratory Course (Based on RT-601)	CC	-	1	1	-	20	30	50
RT-603	Ethnobotany and Indigenous Medicament	CC	3	-	3	30	20	-	50
RT-604	Laboratory Course (Based on RT-603)	CC	-	1	1	-	20	30	50
RT-605	Rural Infrastructure Engineering	CC	3	-	3	30	20	-	50
RT-606	Watershed Management	CC	3	-	3	30	20	-	50
RT-607	Laboratory Course (Based on RT-605+606)	CC	-	2	2	-	20	30	50
RT-E-608	Rural Health Care	EC	2	-	2	30	20	-	50
RT-E-609	Wooden Art	EC	2	-	2	30	20	-	50
RT-E-610	Dhokra Art	EC	2	-	2	30	20	-	50
Total			16	04	20	180	180	90	450

CC= Core Course, EC= Elective Course; *Out of three elective papers any two elective papers may be chosen.

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B.Sc. I SEMESTER

Course Code: RT- 102

Credit:02

Marks: 50

Course Title: Manures and Fertilizers

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Organic fertilizer-Farm Yard Manure (FYM), methods for compost Preparation, different types of pits, material required for FYM, chemical composition of FYM, precaution needed for compost preparation.

Nadep compost- Preparation of Nadep compost, construction and design of nadep compost tank, traditional design and low cost compost pit, quality of good compost, chemical composition of nadep compost.

Bio-fertilizers-Types, principles and application, use of bio-control agents, bio-pesticides, and trap crops for pest management.

Organic Farming-Introduction, concept, Organic production requirements; Biological Intensive nutrient management- organic manures, green manuring, recycling of organic residues.

Reference Books:

- Introductory Soil Science- Dilip Kumar Das
Mrida Vigyan Ayum Khad Urvarak- Dr. N. L. Sharma & Dr. T. B. Singh
Principles of Agronomy- S.S. Reddy
A manual of soil fungi- Joseph C. Gilman
Introductory Soil Science- Dilip Kumar Das
Mrida Vigyan Ayum Khad Urvarak- Dr. N. L. Sharma & Dr. T. B. Singh
Principles of Agronomy- S.S. Reddy
A manual of soil fungi- Joseph C. Gilman
Jav Urvarak- Dushyant Malhotra
Jaivik Kheti- Arun K. Sharma
Manures and fertilizers- Das
Fertilizers A Text Book- Basak
Handbook of fertilizers- Gustafson

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Guru Ghasidas Vishwavidyalaya, Koni-Bilaspur (CG)
Semester-wise syllabus for UG-PG Integrated Course

B.Sc. I SEMESTER

Course Code: RT- 103

Credit:02

Marks: 50

Course Title: Laboratory Course (Based on RT- 101+102)

1. Measurement of soil moisture, pH, bulk and particle density.
2. Study about soil mapping.
3. Soil Survey and preparation of soil survey report.
4. Identification of various fertilizers and compost.
5. Preparation of nadep-compost
6. Preparation of FYM.
7. Identification of bio-fertilizers, bio-pesticides and its preparation.
8. Calculation of fertilizer doses for any crop.



B.Sc. I SEMESTER

Course Code: RT- 107

Credit:02

Marks: 50

Course Title: Elementary Microbiology

Viruses: History, General Characteristics, classification, mode of multiplication, general Account of TMV, important viral diseases-Tomato mosaic disease, Leaf curl of Papaya.

Bacteria: History, General characteristics, morphology, mode of nutrition, cell structure of Gram Positive and Gram negative bacteria, Reproduction in bacteria.

General account of mycoplasma, important mycoplasmic diseases- Little leaf of Brinjal, Sessamum phyllody. General account of Actinomycetes and their importance.

Cyanobacteria: General Characteristics and classification; Reproduction; General account of *Nostoc*, *Anabaena*, *Scytonema*, Economic importance

Economic importance of Bacteria-Agricultural, Industrial and Biotenological importance.

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B.Sc. I SEMESTER

Course Code: RT- 109

Credit:02

Marks: 50

Course Title: Laboratory Course (Based on RT- 107+108)

1. General structure and use of Microscope and study of plant cell.
2. Study of mitosis by using aceto orcein squash of onion root tip.
3. Gram staining of bacteria.
4. Morphological study of representative members of Cyanobacteria: *Nostoc*, *Anabaena*, and *Spirulina*.
5. Study of structure of Akinetes and Heterocyst.
6. Morphological study of representative members of Algae: *Volvox*, *Vaucheria*.
7. Study of plant diseases: Little leaf of Brinjal, Sessamum phyllody, Leaf curl of Papaya, Tobacco mosaic.



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Semester-wise syllabus for UG-PG Integrated Course

B.Sc. II SEMESTER

Course Code: RT- 204

Credit:02

Marks: 50

Course Title: Goat and Pig Production Techniques

Breeds, Breeding and Feeding of goats: Characteristics of important breeds of goat of different regions. Modern techniques in reproduction. Feed, forage, nutrition and rationing.

Housing and health management in goats: Sheds/shelters and their orientation, ventilation, height and roofing material, floor type and space, shelter surroundings, essential appliances and hygiene. Health management in goats.

General caring practices of goat: determination of age, identification, disbudding and dehorning, castration, exercise, hoof trimming, care of bucks, mating seasons, care of kids, does. Techniques of milking and collection of clean milk.

Breeds, Breeding and Feeding of pigs: Characteristics of important breeds of pigs. Breeding systems. Feeding and rationing.

Housing and health management in pigs: Housing strategies for different members in pig, wallows, essential appliances and hygiene. Marketing and transport of pigs. Pig disease (tuberculosis, mycoplasmal pneumonia, Colibacelliosis, Brucellosis, Swine fever, foot and mouth disease, swine pox, ascariasis).

B.Sc. II SEMESTER

Course Code: RT- 205

Credit:02

Marks: 50

Course Title: Dairy Management and Products

Introduction: Study of breeds of cows and buffaloes.

Dairy farm management: Location of different farm buildings, types of barns, housing systems, care of dry and milch cows and maintenance of different dairy cattle registers.

Podder: Classification, hay preparation, types, qualities, principles and calculation of ration.

Animal Breeding Methods: Inbreeding and out breeding, their advantages and disadvantages, Artificial Insemination- its methods, importance, limitations,

Animal Diseases: Classification of diseases, Foot and mouth disease, Anthrax, Black Quarter, Rinderpest, Mastitis and Haemorrhagic septicemia -their diagnosis, treatment & precautions. Vaccination schedule for cattles.

Dairy Products: Processing of milk, pasteurization of milk, method of preparation of butter, cheese, khoa, paneer, yoghurt, cream, and shrikhand.



B.Sc. II SEMESTER

Course Code: RT- 206

Credit:02

Marks: 50

Course Title: Laboratory Course (Based on RT- 204+205)

1. Visit to cow, buffalo, goat and pig farms and report preparation.
2. Study of system of housing for cattle, goats and pigs.
3. Visit to dairy plant and report submission.

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B.Sc. III SEMESTER

Course Code: RT- 302

Credit:02

Marks: 50

Course Title: Poultry Production Techniques

Breeds and Nutrition: Identification and characteristics of important Indian and Exotic poultry breeds, poultry nutrition- nutrients and their functions, energy sources, vegetable and animal protein sources.

Poultry farm Management: Farm system, provisions for good housing, chick and grower management, commercial layer and broiler management.

Breeding and production technology: Principles of breeding, breeding system, development of layer and broiler varieties, assessment of egg quality, nutritive value of eggs, grading of eggs, processing and preservation of poultry products- egg and meat.

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Semester-wise syllabus for UG-PG Integrated Course

Poultry health management: Symptoms, treatment/control and vaccination strategies of- Viral disease (New castle disease/tanikhet, fowl pox, avian influenza, polyneuritis), Bacterial disease (Pullorum, fowl typhoid, fowl cholera, chronic respiratory disease), Parasitic disease (Coccidiosis) and Fungal disease (mycotic pneumonia).

Other poultry species and marketing strategies: elementary knowledge of other poultry species- duck, quail, turkey, emu, geese and pigeon. Egg and meat marketing, distribution channel, exports.



B.Sc. III SEMESTER
Credit:02

Marks: 50

Course Code: RT- 303

Course Title: Lac, Vermi and Apiculture Techniques

Biology of lac insect: Classification and morphology of lac insect, life cycle of lac insect, lac glands and their distribution, history of lac culture in India, states cover under lac production.

Introduction to lac culture: Important host plant species for lac cultivation, Lac cultivation technology, processing technique of raw lac, production of shellac and white lac, study of different types of lac, commercial and domestic use of lac, enemies of lac culture and control measures.

Introduction to Vermiculture: Manure worms, morphology and anatomy of manure worm techniques of vermin-compost production, chemical composition and uses of vermicompost; Vermiwash: Preparation, chemical composition and uses.

Biology of honey bees: Classification and geographical distribution of bee and their races, morphology of honey bee, bee casts, internal anatomy of honey bee, life cycle of honey bee, royal jelly, bee bread and wax, swarming, absconding and supercedure, social organization in honey bee, morphology of bee-hive, bee communication, diseases and pests of honey bee.

Introduction to Apiculture: Definition and scope of apiculture, artificial bee keeping (Apiary), collection techniques of honey from natural sites, physical and chemical properties of honey, Utilization of honey and wax in different commercial products.

B.Sc. III SEMESTER

Course Code: RT- 304

Credit:02

Marks: 50

Course Title: Laboratory Course (Based on 302+303)

1. Visit to poultry farms and report preparation.
2. Study of system of housing for poultry.
3. Identification of different host plants for lac cultivation.
4. Identification of different type of lac.
5. Study of equipments used in apiary.
6. Preparation of vermiwash and vermicompost.

Reference Books:

Chapman: The Insects: structure and function 94th ed, 1998, ELBS)
Imms: A general text book of entomology, 2 vol. (1997, Asia publishing house)
Mcgavin: Essential Entomology 92001, Oxford Univ Press)

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B.Sc. III SEMESTER
Course Code: RT- 305 Credit:02 Marks: 50
Course Title: Mushroom Production Techniques

Introduction- Distribution, History and scope of edible Mushrooms, Characteristic features of Basidiomycotina fungi.

Identification of commonly grown mushroom species in India, Edible mushroom and their characteristics, Nutritional value of Mushrooms, Features of poisonous mushrooms, Medicinal mushrooms and their properties.

Equipments used in spawn preparation and mushroom production, Culture preparation, spawn production technique and their management.

Production Techniques of Oyster Mushroom, Paddy Straw Mushroom, White Button Mushroom and White Milkey Mushroom.

Post-harvest handling of mushrooms, Problems related to mushroom production. Management of pests and diseases.

B.Sc. III SEMESTER
Course Code: RT- 306 Credit:02 Marks: 50
Course Title: Sericulture

Introduction to Sericulture: Definition, history and importance of sericulture, sericulture industry in India, prospects and problems.

Biology of silk moth: Study of mulberry and non-mulberry silk worms- Tasar, Eri and Munga including classification, geographical distribution, hosts plants and silk characteristics produced, anatomy of mulberry silk worm- Digestive system including mouth parts.

Reproductive system, life cycle including moulting and metamorphosis, silk glands, spinning of silk threads, factors influencing silk worm growth and silk production, diseases and pests of mulberry silk worm.

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Semester-wise syllabus for UG-PG Integrated Course

Mulberry cultivation: Types of host plants for sericulture and their propagation, effects of agro-climatic conditions on the growth of host plants with special reference to mulberry, mulberry cultivation and its management, diseases, pests & predators of mulberry plant.

Rearing techniques: Ideal rearing house and its types, advantages and disadvantages, various rearing appliances, Young age (chawki rearing) and late age rearing, mountages and mounting, harvesting of cocoons.

Reeling: Grading of reeling cocoons, stifling of cocoons, reeling machines: charkha, cottage basin, filature & multiend, processing of raw silk.

B.Sc. III SEMESTER

Course Code: RT- 307

Credit:02

Marks: 50

Course Title: Laboratory Course (Based on RT- 305 + 306)

1. Identification of different mushroom species.
2. Culture preparation and Spawn preparation.
3. Paddy straw and oyster mushroom production.
4. Plantation techniques (pit and row) of Mulberry plants.
5. Study of propagation techniques of Mulberry plants.
6. Study of host plants of mulberry and non-mulberry silk worms.
7. Study of morphological characters of mulberry silk worm.
8. Identification of pests and predators of mulberry silk worm.
9. Dissection of alimentary canal and silk gland and study of their various parts.
10. Visit to nearest mulberry silk worm rearing centers.
11. Visit to rearing centers to observe the silk worm diseases and collection of diseased worms.
12. Comparative study of good and defective cocoons.



B.Sc. IV SEMESTER

Course Code: RT- 402

Credit:02

Marks: 50

Course Title: Land Surveying, Leveling and Drawing Techniques

Concept of surveying for rural development, objective, types, units of measurement, instruments used for surveying.

Chain surveying introduction, principle and purpose, accessories for chaining, methods, running survey lines, Types of ranging survey, Errors in chaining, Testing and adjustment of chain.

Plane table survey introduction, principle and purpose, various equipments used in plane table survey, Method of plane tabling, Errors in plane table survey and precautions to use.

Concept of contour, characteristics of contour; Methods of contouring, various contour map application. Concept of leveling, level surface, Differential Global Positioning System (DGPS) and

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Semester-wise syllabus for UG-PG Integrated Course

Global Positioning System (GPS).

Introduction to various drawing techniques, instruments and accessories used for drawing, Sizes of drawing sheets and their layouts, Lettering Techniques and Printing.



B.Sc. IV SEMESTER
Credit:02

Course Code: RT- 403

Marks: 50

Course Title: Building Construction Concepts

Building construction- introduction and site selection, Foundation, choice of soil for foundation, anti-termite treatment for building foundation, foundation failure, concept of green building.

Building construction materials, lime, brick, properties of brick, manufacturing of bricks, Sand. Properties of good sand, components and specification.

Cement, Manufacturing of cement, types of cement, mortar, functions of mortar, Concrete, Reinforced cement concrete (RCC), Flooring material Concept of plastering.

Roof, arches, wall, lential, scaffolding. doors, windows, ventilators.

Reference Books:

- Building Materials: Gurcharan Singh, , Standard Publishers Distributors, Delhi.
Engineering Materials: Rangwala S.C., Charotar Publishing House Pvt. Ltd., Adand.
Engineering Materials: Mittal D.C.,
Engineering Materials: S. Kulkarni G.J.,

B.Sc. IV SEMESTER

Course Code: RT- 404

Credit:02

Marks: 50

Course Title: Laboratory Course (based on RT-402+403)

1. Study of Building materials.
2. Study of various types of bricks and cement.
3. Chain survey for the measurement of the area.
4. GPS use for point selection.
5. DGPS operations in the survey area.
6. Design and drawing of selected planes.

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Course Code: RT- 406

B.Sc. IV SEMESTER

Credit:02

Marks: 50

Course Title: Aquaculture

Ichthyology and its scope, types of carp fishes and their characteristic features, common major and minor carps found in Chhattisgarh, larvivorous fishes, ornamental fishes.

Types of fins and scales, colouration, digestive system and feeding behavior, respiratory organs: aquatic and air breathing, swim bladder, excretion and osmoregulation, endocrine glands, reproductive system and development, breeding of fish, fish seeds.

Chemical composition of fish, preparation and maintenance of aquarium, plankton and their importance, economic value of fish, common disease of fish and their cure.

Definition and classification of fisheries, fish culture in ponds, composite fish farming and air breathing fish culture, fishing crafts and gears, fish preservation and processing, government schemes related to fish culture.

Prawn culture and its economic importance, pearl culture and its economic importance.

B.Sc. IV SEMESTER

Course Code: RT- 407

Credit:02

Marks: 50

Course Title: Laboratory Course (Based on RT- 405 + 406)

1. Gram staining of bacteria.
2. Culture preparation of bacterial biofertilizers.
3. Mass cultivation of Cyanobacteria.
4. Mass cultivation of *Azolla*.
5. Morphological studies of different fish types.
6. Study and mounting of fish scales and fins.
7. Identification of fish by fin formula.
8. Identification of diseased fishes.

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17



B.Sc. IV SEMESTER

Course Code: RT- 409

Credit:02

Marks: 50

Course Title: Nursery Management Techniques

Importance of Nursery, Types of nursery system, Physical and Financial resources for Nursery, Capital components of Nursery, Nursery Expenditure, Income and Profit analysis.

Plant propagation material, integrated nutrient management, irrigation system, Plant propagation

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Department of Rural Technology & Social Development
Guru Ghasidas Vishwavidyalaya, Koni-Bilaspur (CG)
Semester-wise syllabus for UG-PG Integrated Course

method- Sexual and Asexual propagation, Vegetative Propagation- Budding, Layering and Grafting, Micro-propagation and hardening. Packing and transport of nursery plants.

Plant propagation structures in Plant nursery-Quonset, Gutter connected, Glass House, plastic Film Green House, Rigid Panel Greenhouses and Greenhouse with Double-Layer Covering.

Plantation Techniques: Site selection, preparation and management, soil analysis, species selection, pit formation, distance between plant to plant and row to row, pit filling.

Planting time and planting method- entire plant planting and stump planting, clonal plantation, irrigation, management of planted plant, pre and post activity in plantation.

Reference Books:

Plantation Forestry : R.K. Luna
Nursery Technology: S.S. Negi
Plant Propagation and Nursery Husbandry: J.S. Yadav
Introductory Horticulture: E.P. Christopher



B.Sc. IV SEMESTER

Course Code: RT- 410

Credit:02

Marks: 50

Course Title: Laboratory Course (Based on RT-408+ 409)

1. Preparation of herbaria of food, oil producing, fibre yielding plants.
2. Visit to field for identification of different crop insects-pest and their nature of damage.
3. Visit to field for identification of different crop diseases and their symptoms.
4. Preparation of herbarium for different disease symptoms.
5. Preparation of soil mixture for nursery bags.
6. Mass propagation of ornamental plants.

Reference Books:

Economic Botany Pandey-

Medicinal Plants: Conservation, Cultivation and Utilization Chopra, Khanna, Prasad, Malik, Bhutiani
Daya Publication, New Delhi

Medicinal Plants Robert Bentley, Henri Trimen-

Plantation Forestry : R.K. Luna

Nursery Technology: S.S. Negi

Plant Propagation and Nursery Husbandry: J.S. Yadav

Introductory Horticulture: E.P. Christopher

Plantation Forestry : R.K. Luna

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Department of Rural Technology & Social Development
Guru Ghasidas Vishwavidyalaya, Koni-Bilaspur (CG)
Semester-wise syllabus for UG-PG Integrated Course

B.Sc. V SEMESTER
Course Code: RT- 501 Credit:03 Marks: 50
Course Title: Introduction to Remote Sensing

Introduction & Definition of Remote Sensing, Kinds of Remote Sensing, History and development of Remote Sensing in world. Advantages of remote sensing. Real and Ideal Remote Sensing

Energy Sources, Electro magnetic Energy, Electro magnetic Spectrum & Radiation, Scattering, Absorption and Reflectance in Remote Sensing. Spectral reflectance response of different earth surface features.

History of Aerial Remote Sensing, type of Aerial photograph, Photographic scale, introduction to Photogrammetry, application of photogrammetry in vertical aerial photograph, difference between satellite image and aerial photograph, stereoscope and platform.

Platform, Kinds of platforms Introduction to Satellite, Polar orbiting, Geosynchronous and GPS Satellites, their functions and importance

Map, spatial elements in image, classification of maps, Map scale, Spatial referencing system, map projection.

Reference Books:

- F.F. Sabins : Remote Sensing – Principles & interpretation
- Dr. P. Nag, Dr. M. Kudrat : Digital Remote Sensing, Concept Publishing company 1998
- P.J. Curran : Principles of Remote Sensing, Longman.
- J.A. Richards : Digital Image Processing in Remote Sensing, Springer
- F.F. Sabins : Remote Sensing – Principles & interpretation
- Lillesand & Keifer : Remote Sensing & Image interpretation



B.Sc. V SEMESTER
Course Code: RT- 502 Credit:01 Marks: 50
Course Title: Laboratory Course (Based on RT-501)

1. Develop awareness about toposheet.
2. Method of using Remote Sensing & GIS Software & its tools.
3. Importing of data to ERDAS IMAGINE.
4. Digital photogrammetry.
5. Image Classification, Geometric correction of topo-sheet.

B.Sc. V SEMESTER
Course Code: RT- 503 Credit:03 Marks: 50
Course Title: Introduction to Medicinal Plants

Introduction to different parts of medicinal plants- Stem, Root, Leaf, Flowers, Fruits, Seeds, Woods, Ergastic substance of plants, Unorganised drugs- Gums, Resins, Lattices.

Cultivation Techniques of medicinal plants- Eco friendly farming, Organic farming, Nature farming, Ecological farming systems, Integrated intensive farming system, LEISA, Biodynamic agriculture.

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12-04-16

Department of Rural Technology & Social Development
Guru Ghasidas Vishwavidyalaya, Koni-Bilaspur (CG)
Semester-wise syllabus for UG-PG Integrated Course

Disease of medicinal plants- What is plant disease, A healthy plant, plant and pathogen relationship, disease development stages, nature and classification of plant disease. Diseases of medicinal plant - *Withania* and *Ratuvolfia*.

Collection and processing of crude drugs- Collection, Harvesting, Drying, Decoction, Garbling, Packing, Storage, Active constituents, Standerization of medicinal plants.

Assesment of herbal medicine-Traditional medicine programme, Importance of plant derived drugs, WHO guidelines for assessment of herbal drugs, objective for improvement, and its strategy.

B.Sc. V SEMESTER
Course Code: RT- 504 Credit:01 Marks: 50
Course Title: Laboratory Course (Based on RT-503)

1. Morphological study of available local medicinal plant.
2. Anatomical study of available local medicinal plants.
3. Processing Practices of collected medicinal plant products.
4. Study of Plant Diseases of medicinal plants.
5. Preparation of herbaria of locally available plants.



Department of Rural Technology & Social Development
Guru Ghasidas Vishwavidyalaya, Koni-Bilaspur (CG)
Semester-wise syllabus for UG-PG Integrated Course

B.Sc. V SEMESTER

Course Code: RT-E- 508

Credit:02

Marks: 50

Course Title: Computer and its Application for Rural Development

Elementary knowledge of Computer, Characteristic of computers, Classification of Computers, functions and application, Limitations of computers.

Types of computers, Types of Processors, Input and Output Devices, Memory, volatile and non volatile and cache memory.

Hardware and its component, software, network and network topology, Mesh network, star network, ring network, bus network.

Application-MSEXCEL: Creating, Editing and saving a spreadsheet with MSEXCEL; Use of in-built Statistical and other functions, Internet, email, video conferencing, e-learning, Edusat, power point presentation

Computer Applications for Rural Development, constraints, Role of computer education in Rural Development.

Reference Books:

Computer organization and design-Pal Chaudhuri
Fundamental of Computers-4th Edition Raja Raman
Fundamental of Graphics and multimedia-Mukharjee
Programming in Basic-3rd edition Bala Guru samy
A Rural Computer consulting Business : John. D. Deans



Department of Rural Technology & Social Development
Guru Ghasidas Vishwavidyalaya, Koni-Bilaspur (CG)
Semester-wise syllabus for UG-PG Integrated Course

Energy security - D. Bhaskaran Rao

B.Sc. V SEMESTER

Course Code: RT-E-510

Credit:02

Marks: 50

Course Title: Entrepreneurship and Small Business Management

Entrepreneurship- Meaning, definition and concept of Entrepreneurship. Importance of being an entrepreneur, qualities of a successful entrepreneur, types of entrepreneurs, functions of an entrepreneur, issues and Problems faced by Entrepreneurs.

Micro, small and medium enterprises (MSME) - Meaning, characteristics and scope of MSME, classification of MSME, importance of small business in India.

Project Management of Small Business- characteristics, needs and Classification of a project, phases of project management, roles and responsibilities of project manager.

Establishment procedure of Small Business: Identifying entrepreneurial opportunity, Preparation of Plan of Action, Deciding the nature and forms of business, Location of Business, Arrangement of Resources, Legal formalities.

Government Policy towards Small Business, Industrial and commercial policy of Chhattisgarh- Schemes and programs for entrepreneurship development. Institutional Support to Small Business: NSIC, SSIDCs, NABARD, KVIC, SISIs, SIDBI.

Reference Books:

- S.S. Kanka: Entrepreneurial Development
Prasanna Chandra: Project Planning, Analysis, Selection, Implementation and Review Tata McGraw Hill.
Vasantha Desai: Dynamics of Entrepreneurial Development
C.B. Gupta & N.P. Sreenivasan: Entrepreneurial Development
Grain Management: To Ensure Food Security, Dr. Anupam Tiwari, Marks Books, New Delhi
Nirmal K. Gupta: Small Industry - Challenges and Perspectives

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B.Sc. VI SEMESTER

Course Code: RT-601 Credit:03 Marks: 50
Course Title: Sensor and Digital image processing in Remote Sensing

Sensor – Active and passive sensor, imaging and non –imaging sensor. Sensors used in satellites. Image resolution and its type.

Specific features of Indian remote sensing satellites series, some other countries satellite.

Microwave remote sensing: Radar principle, SLAR, SAR. Geometrical characterization. Slope foreshortening, Layover, Aspects, Radar shadow.

Introduction to Digital Image Processing(DIP),Image Structure, Preprocessing of image, Image Enhancement, Vegetative index, Supervised & Unsupervised Classification.

Introduction to GIS, Components of GIS, Data Structure- Raster & Vector formats, Data Encoding & Storage, Data Manipulation & Data Output, Introduction to Data Base management.

Reference Books:

- Remote Sensing – Principles & interpretation: F.F. Sabins
Digital Remote Sensing, Concept Publishing company: Dr. P.Nag, Dr. M. Kudrat
Principles of Remote Sensing, Longman: P. J. Curran
Digital Image Processing in Remote Sensing: J. A. Richards Springer
Remote Sensing – Principles & interpretation: F. F. Sabins
Remote Sensing & Image interpretation: Lillesand & Keifer
Remote Sensing – Principles & interpretation: F.F. Sabins

B.Sc. VI SEMESTER

Course Code: RT-602 Credit:01 Marks: 50
Course Title: Laboratory Course (Based on RT-601)

1. Creating different features like polygon, Line, tic (point), Polyline, Creation of personal geo database,
2. Digital Image Processing (DIP)
3. Techniques such as PCA, HIS.

B.Sc. VI SEMESTER

Course Code: RT-603 Credit:03 Marks: 50
Course Title: Ethnobotany and Indigenous Medicament

Ethnobotany- Definition and scope, Traditional and alternative systems of medicines- Ayurveda, Unani, Homeopathy, Sidha & Aromatherapy, Classification of crude drugs- Alphabetical, Taxonomical, morphological, chemical and Pharmacological.

Ethnomedicinal plant- *Allium sativum*, *Aloe vera*, *Azadiracta indica*, *Ricinus communis*, *Terminalia arjuna*, *T. bellarica*, *T. chebula*, *Oscimum sanctum*, *Withania somnifera*, *Commiphora wightii* (Googul).



Guru Ghasidas Vishwavidyalaya, Koni-Bilaspur (CG)
Semester-wise syllabus for UG-PG Integrated Course

Therapeutic uses of Traditional plants- Ghritkumari, Capsicum, Garlic, Ginger, Turmeric, Alfalfa, Calendula, Goldenseal.

Study of indigenous drugs, its common name, botanical sources - Morphology, chemical nature of major contents, Action, Categories, user and marketed information of the following drugs (i) Amla, (ii) Shankhpushpai (iii) Brahmi, (iv) Punarnava (v) Chitrak (vi) Gokhru.

Natural Pesticides- Pyrethrum, Neem, Tobacco, natural antibiotics, allergenic extracts- pollen extract, fungal extract, dust, food extracts.

Reference Books:

Medicinal plants of India Vol 1 & 2 ICAR - Kirtikar & Basu
Medicinal Plant cultivation- Purohit and Vyas
Indigenous medicinal specialties - U.S. Narayan Rao
Agro Techniques of medicinal Plants- Ravindra Sharma
Cultivation and utilization of Aromatic plants - C.K. Atal and B.M. Kapoor.
Cultivation and utilization of medicinal plants - C.K. Atal and B.M. Kapoor.
Plant Taxonomy- O.P. Sharma
Essential of Plant Taxonomy and Ecology-M.P. Singh and S.G. Abbas

B.Sc. VI SEMESTER
Course Code: RT-604 Credit:01 Marks: 50
Course Title: Laboratory Course (Based on RT-603)

1. Preparation of herbarium of local medicinal plants.
2. Therapeutic preparations of Aloe vera, Capsicum, Ginger, Garlic etc.
3. Ethnobotanical study of common plants.

B.Sc. VI SEMESTER
Course Code: RT-606 Credit:03 Marks: 50
Course Title: Watershed Management

Concept of land and water management, LULC pattern, Soil erosion, Water erosion, runoff erosivity factor.
Hydrological cycle, rainfall and its measurement, Meteorological data analysis, ground and surface recharge, water conservation and recycling.
Watershed management concept- objectives, types, characterization, planning and execution, suitable plants and crops for watershed area
Introduction to integrated watershed management programme and their impact, Application of Remote Sensing & GIS in watershed management for Natural Resource Management.

Reference Books:

Integrated watershed management: Rajesh Rajora
Watershed management: E.M. Tidema
Soil erosion and conservation: R.P. Tripathi and S.P. Singh
Land and Water Management: V.V.N. Murti

B.Sc. VI SEMESTER
Course Code: RT-607 Credit:02 Marks: 50
Course Title: Laboratory Course (Based on RT-605+606)

1. Visit of bridges.
2. To study about cross section of the road.
3. Visit to watershed area and identification of problems.
4. Preparation of various models for watershed management.
5. Watershed Map preparation through remote sensing.



B.Sc. VI SEMESTER
Credit:02

Marks: 50

Course Code: RT-E-608

Course Title: Rural Health Care

Rural Health: Understanding of health, epidemiology, natural history of diseases, determinants of health, indicators of health.

Rural Health and Nutrition Status: Health and nutrition linkages and status, dietary intake, trends in health and nutrition, factors influencing health and nutrition status.

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27
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Department of Rural Technology & Social Development
Guru Ghasidas Vishwavidyalaya, Koni-Bilaspur (CG)
Semester-wise syllabus for UG-PG Integrated Course

Rural Health and Communicable Diseases: Understanding communicable diseases, different communicable diseases and etiology of - respiratory infection, water and food borne infections, contact diseases, arthropod borne diseases, zoonosis and others. Characteristics of common communicable diseases.

Rural Health Management 1: Prevention and control of communicable diseases.

Rural Health Management 2: Health care services- (a) general services, (b) Maternal and child health services (c) services provided under national health program

Reference Books:

Health Care in Rural Areas: J. Cyril kanmony
Tribal Fertility, Morality And Health Care Practices: R. Mutharayappa
Rural Behavioral Health Care: An Interdisciplinary Guide: B. Handnall Stamm



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Course Code: RT-E-609

B.Sc. VI SEMESTER
Credit:02

Marks: 50

Course Title: Wooden Art

Fundamental of wooden art: Introduction, objective, ritual value, distribution in India and Chhattisgarh.

Types of raw material used, raw material availability, tools used, traditional and modern design technique used, methodology used for preparation of wood structure, planning, management and quality control.

Marketing of wooden art in various levels, status of wooden market in India and Chhattisgarh, problems related with rural market.

Socio-economic status of wooden artisan, relationship between forest department and rural artisan.

Entrepreneurship and sustainable development of wooden artisan, contribution of Government and Non-government organizations for wooden art.

Reference Books:

Sculpture in Wood: Jack C. Rich

The book of Wood Carving : Technique, Design and Projects – Charles Marshall Sayers

Manual of Traditional Wood Carving: Paul N. Hasluck

B.Sc. VI SEMESTER
Credit:02

Marks: 50

Course Code: RT-E-610

Course Title: Dhokra Art

Fundamental of Dhokra art: Introduction, distribution in India and Chhattisgarh, Scope, Objectives, Vision.

28