



शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर

धरमपुरा-2, जगदलपुर, जिला-बस्तर, छत्तीसगढ़, भारत पिनकोड 494001

Shaheed Mahendra Karma Vishwavidyalaya, Bastar

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क्रमांक / 946 / अका. / पाठ्यक्रम / 2022

जगदलपुर, दिनांक / 10 / 2022

// अधिसूचना //

21 OCT 2022

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर जगदलपुर के विद्यापरिषद की बैठक दिनांक 11.07.2022 एवं कार्यपरिषद की 40वीं बैठक दिनांक 14.07.2022 में लिये गये निर्णयानुसार विश्वविद्यालय शिक्षण विभाग के अन्तर्गत विभिन्न अध्ययनशाओं में एवं विश्वविद्यालय से संबद्ध महाविद्यालयों में संचालित निम्नलिखित स्नातकोत्तर पाठ्यक्रमों के संशोधित सिलेबस सत्र 2022-23 से लागू किया जाता है:-

क्रमांक	विषय/पाठ्यक्रम का नाम	परीक्षा प्रणाली
1	एम.ए. हिन्दी	सेमेस्टर परीक्षा प्रणाली
2	एम.कॉम. वाणिज्य	सेमेस्टर परीक्षा प्रणाली
3	एम.ए./एम.एस.सी. मानवविज्ञान एवं जनजातीय	सेमेस्टर परीक्षा प्रणाली
4	एम.एस.सी. वानिकी एवं वन्यजीव	सेमेस्टर परीक्षा प्रणाली
5	एम.एस.सी. ग्रामीण प्रौद्योगिकी	सेमेस्टर परीक्षा प्रणाली
6	एम.एस.सी. कम्प्यूटर साइंस	सेमेस्टर परीक्षा प्रणाली
7	एम.सी.ए. कम्प्यूटर अनुप्रयोग	सेमेस्टर परीक्षा प्रणाली
8	एम.एस.सी. रसायनशास्त्र	सेमेस्टर परीक्षा प्रणाली
9	एम.ए. राजनीति विज्ञान	सेमेस्टर परीक्षा प्रणाली

उपरोक्त पाठ्यक्रमों को छोड़कर अन्य स्नातकोत्तर पाठ्यक्रम पूर्ववत यथावत रहेंगे।

कुलसचिव

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर

जगदलपुर, जिला-बस्तर (छ.ग.)

जगदलपुर, दिनांक / 10 / 2022

21 OCT 2022

पृ. क्रमांक / / अका. / पाठ्यक्रम / 2022

प्रतिलिपि:-

- माननीय राज्यपाल एवं कुलाधिपति के सचिव, राजभवन, रायपुर
- सचिव छ.ग. शासन, उच्च शिक्षा विभाग, मंत्रालय, महानदी भवन, नवा रायपुर अटल नगर, जिला-रायपुर
- आयुक्त, उच्च शिक्षा संचालनालय, इन्द्रावती भवन, नवा रायपुर अटल नगर, जिला-रायपुर
- माननीय कुलपति महोदय, शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर जगदलपुर
- क्षेत्रीय अपर संचालक, उच्च शिक्षा, शासकीय काकतीय स्नातकोत्तर महाविद्यालय, जगदलपुर
- समस्त प्राचार्य, संबद्ध समस्त शासकीय एवं अशासकीय महाविद्यालय, शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर, जगदलपुर
- समस्त विभाग प्रमुख/विभागाध्यक्ष, समस्त अध्ययनशाला, शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर जगदलपुर - को ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

सहायक कुलसचिव (अकादमिक)

शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर

जगदलपुर, जिला-बस्तर (छ.ग.)

05 JUL 2022

**SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR, JAGDALPUR
SESSION 2022-23**



शहीद महेन्द्र कर्मा विश्वविद्यालय, बस्तर जगदलपुर (छ.ग.)

**SHAHEED MAHENDRA KARMA VISHWAVIDYALAYA, BASTAR
JAGDALPUR, CHHATTISGARH**

Syllabus

M.Sc. Rural Technology

(Semester Pattern)

Session 2022-23

SCHOOL OF STUDIES IN RURAL TECHNOLOGY, BASTAR VISHWAVIDYALAYA, JAGDALPUR

SEMESTER SCHEME

M. Sc. Rural Technology

Subject Code	Course	Marks Distribution			Total Credit
		Theory Marks	Internal Marks	Total Marks	
I Semester					
RT-101	Sustainable Rural Technology for Livelihood Improvement	80	20	100	4
RT-102	Rural Energy Sources	80	20	100	4
RT-103	Appraisal and Action for Rural Development Planning and Voluntary Action	80	20	100	4
RT-104	Statistical Analysis And Computer Application for Rural Development	80	20	100	4
RT-105	Laboratory Course			100	2
RT-106	Field Work			100	2
Total		320	80	600	20
II Semester					
RT-107	Research Methodology	80	20	100	4
RT-108	Fundamentals of Medicinal Plants	80	20	100	4
RT-109	Entrepreneurship and Small Business Technology and Management	80	20	100	4
RT-110	Remote Sensing and GIS for Rural Planning	80	20	100	4
RT-111	Laboratory Course			100	2
RT-112	Seminar			100	2
Total		320	80	600	20
III Semester					
RT-113	Indigenous Art and Its Management	80	20	100	4
RT-114	Natural Product Management	80	20	100	4
RT-115	Medicinal Plant Production Techniques and Extraction	80	20	100	4
RT-116	Food Science Technology and Value Addition in Natural Product	80	20	100	4
RT-117	Laboratory Course			100	2
RT-118	Seminar			100	2
Total		320	80	600	20
VI Semester					
RT-119	Rural Infrastructural Engineering	80	20	100	4
RT-120	Soil and Water Conservation Engineering	80	20	100	4
RT-121	Aquaculture	80	20	100	4
RT-122	Dissertation work			200	8
Total		240	60	500	20
Grand Total		1200	300	2300	80

*Field work and seminar are internally assessed.

*Laboratory course and dissertation work will be assessed by external examiner.

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(Dr. D. P. Singh)

M.Sc. (Rural Technology) FIRST SEMESTER**Paper: RT – 101****Subject: Sustainable Rural Technology for Livelihood Improvement**

Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04

- Unit -1 Lac Production Technique- Insect morphology, Life Cycle of Lac Incest, History of lac production, Important host for lac production, Lac cultivation practices, Processing and uses of lac
- Unit-2 Mushroom Production- Introduction, Biology of the Mushroom, Medicinal and Poisonous mushroom, Spawn preparation, Value Addition, Preservation Techniques, Production technology of Oyster mushroom, Paddy Straw mushroom and Button mushroom, Insect and Pest management, marketing and it's management.
- Unit-3 Apiculture- honey bees and their types, Life Cycle of Honeybee, bee colony organization, area of distribution, bee equipments, management of pests and disease, honey formation and characterization.
- Unit-4 Mulberry and non - mulberry Sericulture- Species of silk worms, Life cycle of Silkworm, Production of mulberry and non - mulberry silk in India, Rearing of tasar and mulberry silk worm, pest predators of tasar and mulberry silk worm, tasar and mulberry industries in Chhattisgarh, problem of tasar and mulberry culture .
- Unit -5 Vermi culture- Species, morphology of verms, growth feature of verms and climatic effect and production of vermi-compost. Bio-gas generation and management, Vermi Wash, Uses.

Reference Books

"Mori-culture, instructional cum practical Manual ". Vol-1, Dr. A.K. Dhote.

"Development of Sericulture "M. Laxmi Narasaiah

An introduction of Sericulture, G & J Sulochana

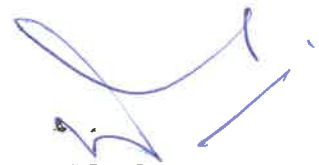
Tropical Tasarculture. P. Mohanty

Mushroom Culture in India - Neeta Bhal

Lac cultivation - C.R. Negi

Lac production technique - ILRI Publication Ranchi

Handbook of mushroom cultivation and packing

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M.SC. (Rural Technology) FIRST SEMESTER**Paper RT-102****Subject: Rural Energy Sources**

Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04

- Unit -1 Introduction, Sources of energy, classification of energy, Energy demand in rural and urban Sector, future energy challenges, Need for rural energy development.
- Unit -2 Various renewable energy sources, appropriate technology for rural energy, Barriers in Rural Energy Sector. Transformation of energy, energy crisis and its mitigation. Importance of energy conservation.
- Unit - 3 Bio-gas technology, anaerobic fermentation process, hydrolysis acidification and methanol genesis, factors affecting gas yield, retention time, composition and characteristics of bio - gas, bio - gas uses, bio - gas model.
- Unit -4 Solar Energy- Solar radiation, solar water heating, solar drying, solar greenhouse, solar energy use in rural areas. Solar cell, PV Cells, Type of PV system, Efficiency of solar cells, application of solar photovoltaic, Wind Energy.
- Unit -5 Bio-Fuel : Properties, Characteristics, Principle energy crops - sugarcane and starch bearing plants. Characteristics of Biodiesel, Economic feasibility of biodiesel.

Reference Books

Non conventional energy - G.D. Rai

Energy security - D. Bhaskaran Rao

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M.Sc. (Rural Technology) FIRST SEMESTER**Paper: RT - 103****Subject: Appraisal and Action for Rural Development Planning & Voluntary Action.**

Theory Marks: 80

Internal Marks: 20

Total Marks: 100 Credit: 04

- Unit - 1 Rural Development : concepts , strategies and experience , Rural settlement , Characteristics of Rural life , Rural Social structure , rural development program related with different five year plans , Specific program for rural area upliftment, Fundamentals of Panchayatiraj, Different schemes of State/Central Government and Reputed Agencies.
- Unit - 2 PRA- Definition , Principles and Approaches of PRA , Steps of PRA- Direct observation , Rapport building , DIY , SSI and FGI. Features of PRA- Triangulation, Learning in the community, Onsite analysis, Multidisciplinary Team, Uses of appropriate tools.
- Unit - 3 Types of PRA- Deductive PRA, topical PRA, exploratory PRA, planning and implementing of PRA, monitoring and evaluative PRA. PRA Tool- Mapping , Types of mapping- social resource / land use pattern map , enterprise map , transect walk , time line , change and trends , Matrix ranking , Mobility map , Venn diagram .
- Unit - 4 RRA : Introduction , foundation , process , difference between RRA and PRA , PLA : introduction , foundation , PLA process , opportunities for learning , extending the basic PLA process , experience and issues .
- Unit - 5 Voluntary Action- Voluntary effort in rural development , NGO's : Definition , Concept , Objectives & Characteristics , Role of NGO's , History of NGO's in India , NGO's and Voluntary organization . Voluntary effort in rural development, major Voluntary organization in India.

Reference Books

- Participatory rural appraisal in agricultural animal husbandory- Shagufta Jamal and H. P. S. Arya
- Participatory rural appraisal and questionnaire survey - NeelaMukharjee
- Participatory rural appraisal methodology and application - NeelaMukharjee
- Participatory learning and action- NeelaMukharjee
- Participatory rural appraisal in agricultural animal husbandory- Shagufta Jamal and H. P. S. Arya.
- CAPART Manual
- Gram Sabha- Jain S.P.
- NGO Handbook:Nabhi's Board of editors
- Madhya Pradesh & Chhattisgarh Societies Registration Act, 1973.
- Empowering communities: Dr. Anil Prashad&GiriBabu

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M.Sc. (Rural Technology) FIRST SEMESTER**Paper: RT – 104****Subject: Statistical Analysis & Computer Application for Rural Development**

Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04

Unit – 1 Introduction and Definition of statistics, Concept of Variables, Collection, Classification, tabulation, graphical and diagrammatic representation of numerical data. Central Tendencies Mean, Median, Mode; Dispersion- Mean deviation, Standard deviation, Coefficient of Variation, Skewness and Kurtosis.

Unit - 2 Sampling Methods- Statistical Test Hypothesis, Parametric test- z, t, F and Chi square distribution. Correlation and Regression Analysis. Analysis of Variance (ANOVA). Scales- Need for scales, scaling procedures, Thurston type, Likert type, Bogardus type Semantic differentials.

Unit – 3 Probability Concept of random experiment, various definition of probability, Addition theorem of probability, Probability distributions (viz. Binomial, Poisson and normal) and their applications.

Unit – 4 Elementary knowledge of computer, Terminology of Related to Computer, Generations of Computer, Windows operating System Need and scope of Computer Applications for Rural Development. Types of Computer. Computer Hardware, Hardware and Software, Network, Internet Operating System & Internet Email, Viruses. Typing text, Selecting text, Deleting text, Undo, Redo, Repeat, Inserting text, Cut, Copy, Paste - Printing .

Unit – 5 Word Processing: Introduction and working with MS - Word in MS Office, Word basic commands, formatting text and documents, sorting and tables. Spread sheet: Working with Excel, formatting function chart features, working with graphics in excel. Presentation with power point: Power point basics, creating presentations the easy way, working with graphics in power point, show time, sound effects and animation effects.

Reference Books

An Introduction to Statistical Methods - Gupta C.B.

Statistics for Management, Levin, Richard I. and David S. Rubin.

Fundamentals of Statistics- D.N. Elhance, Veena Elhance and B. M. Aggrawal

Computers concepts and uses - Summer, M.

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M.Sc. (Rural Technology) FIRST SEMESTER

Paper: RTL – 105

Marks: 100

Credit: 02

Subject: Laboratory Course (Based on RT - 101 + 102 + 104)

1. Study of equipments used in spawn preparation and mushroom production.
2. Study of equipments used in apiculture and sericulture.
3. Preparation of vermi-compost and vermi-wash in the field.
4. Identification of different type of solar equipment.
5. Identification of different type of biogas model.
6. Identification of lac insect, the host plant and their characteristics, Identification of honeybee species.
7. Microscopic observations of Biological materials.
8. Study of plantation technique of pit and row different species of Mulberry plants.
9. To make a power point presentation related with above practical work.
10. Study of Silkworm Realign Equipment's
11. Preparation of model of VarmiWash

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05 JUL 2022

M.Sc. (RuralTechnology) FIRST SEMESTER

Paper: RTFW - 106 Marks: 100 Credit: 02


Subject: Field Work (Based on RT - 101 + 103)

1. Visit to nearest mulberry farms and fields
2. Visit and study of KrishiVigyanKendra.
3. Selection of village for social mapping, resource mapping, transect walk.
4. Preparation Venn diagram for selected village,
5. Matrix ranking on different aspects.
6. Visit to honey bee Garden/Nursery.
7. Visit to CREDA

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M.Sc. (Rural Technology) SECOND SEMESTER

Paper: RT - 107

Subject: Research Methodology

Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04.

- Unit - 1 Motivation in Research, Research Process, Criteria of Good research, Nature and scope of research methodology, scientific inquiry and study of social phenomenon, problems, formulations and statement of research objectives.
- Unit - 2 Research design- Exploratory, descriptive, and experimental research design, Qualitative and quantitative research. Complete Randomized Block Design (CRD), Randomized Block Design (RBD), Latin Squares Design (LSD) and factorial design.
- Unit - 3 Hypothesis- meaning and role in research, Hypothesis testing methods. Method of data collection and its measurement, Observational and survey methods. Case studies, interview schedule and questioner, data sources: primary and secondary.
- Unit - 4 Types of Reports- Research Reporting and scientific writing- Preparation of research proposal, compilation of thesis, dissertation, reports.
- Unit - 5 Compilation of research paper, paper presentation, compiling bibliography.

Reference Books

Survey Method

Exploring research.

Guide to the successful thesis and dissertation Vth Edition.

Fundamentals of Statistics

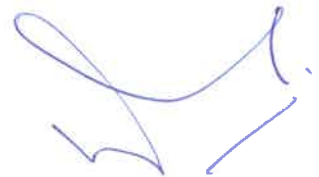
Social Research & statistics, Ravindra Nath Mukarajee.

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M.Sc. (Rural Technology) SECOND SEMESTER

Paper: RT - 108

Subject: Fundamentals of Medicinal Plants

Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04

- Unit - 1 Methods of plant classification, General Characteristics of Root, Rhizome, Stem, leaf, fruit and Seeds, plant Taxonomy with special reference to the study of Asclepiadaceae, Apiaceae, Chenopodiaceae, Euphorbiaceae, Combretaceae, Liliaceae families. Medicinal plant found in Chhattisgarh.
- Unit -2 Propagation of Medicinal Plants- Relation between Nursery & Environmental factors Organization and development of Nursery, components, operations, propagation through cutting, budding, layering, grafting.
- Unit - 3 General aspects & Medicinal values of *Kalanchoepinnata*, *Ipomoea nil*, *Mucunapruiens*, *Piper nigrum*, *Plumbagozeylanica*, *Aconitum nepalus*, *Gloriosasuperba*, *Aeglemarmelo*, *Vitisvinifera*, *Cinnamomumsp.*, *Crocus sativus*, *TinosporaCardifolia* (गिलोय).
- Unit - 4 Ecological Management of Pest, Habitat diversification, Water management, Physical and Biological Control of pest, Biopesticides and its types.
- Unit - 5 Market potential of crude drugs, legislation and policy of medicinal plants - National and State Medicinal Plant Board, Conservation of medicinal plants, Goals of national policy, Future action plan. WHO guidelines for assessment of herbal drugs, objective for improvement, and its strategy.

Reference Books

- Medicinal plants of India Vol 1 & 2 ICAR - Kirtikar&Basu.
Compendium of Indian Medicinal plants Vol 1-4 - R. P. Rastogi& B.N. Mahrotra.
Indigenous medicinal specialties - U.S. Narayan Rao.
Useful plant of Neotropical origin - HeingBrucher. , Plant Taxonomy- O.P. Sharma
“Cultivation and utilization of Aromatic plants - C.K. Atal and B.M. Kapoor.
Essential of Plant Taxonomy and Ecology - M.P. Singh and S.G. Abbas

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M.Sc. (RuralTechnology) SECOND SEMESTER

Credit: 04 Paper: RT – 109

Entrepreneurship and Small Business Technology & Management

Theory Marks: 80 Internal Marks: 20 Total Marks: 100

Credit: 02

- Unit-1 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.
- Unit - 2 Micro, small and medium enterprises (MSME) -Meaning, characteristics and scope of MSME, classification of MSME, importance of small business in India. Choosing a career, concept of career, importance of choosing a career, career avenues in business, wageEmployment, self - employment.Possible areas of self - employment, qualities required for success in self – employment.
- Unit - 3 Project Management and Setting up a Small Business - characteristics, needs and Classification of a project, phases of project management, roles and responsibilities of project manager, Identifying entrepreneurial Opportunity, Preparing Plan of Action, Deciding the nature and forms of business, Location of Business, Arrangement of Resources, Legal formalities.
- Unit - 4 Government Policy towards Small Business Industrial and commercial policy of Chhattisgarh. Schemes and programs for entrepreneurship development.Institutional Support to Small Business: National Small Industries Corporation (NSIC), State Small Industries Development Corporations (SSIDCs), National Bank for Agriculture and Rural Development (NABARD), Khadi and Village Industries Commission (KVIC), Small Industries Service Institutions (SISIS), Small Industries Development Bank Of India (SIDBI), District Industries Centers:
- Unit - 5 Product Based Entrepreneurship Development Training- Hand embroidery, Agarabathi making , Soft Toys making, Paper cover, Paper bag , Envelop & File making , Manufacture of Utility items from waste, Candle light Making, Soap Making. Screen printing, Herbal Coffee making, etc.

Reference Books

S.S. Kanka:Entrepreneurial Development

P. Chandra: Project Planning, Analysis, Selection, Implementation and Review Tata McGraw Hill.

VasanthaDesai: Dynamics of Entrepreneurial Development

C.B. Gupta & N.P. Sreenivasan: Entrepreneurial Development

Dr. AnupamTiwari: Grain Management: To Ensure Food Security, Marks Books, New

Delhi Nirmal K. Gupta: Small Industry - Challenges and Perspectives

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M.Sc. (Rural Technology) SECOND SEMESTER**Paper: RT - 110****Subject: Remote Sensing GIS for Rural Planning.****Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04**

Unit - 1 Concepts & Fundamental of Remote Sensing: Introduction, Early History, Energy Sources & Radiation Principles, Energy Interactions in the atmosphere, Energy Interactions with Earth surface. Features, Spectral Reflectance of vegetation, Soil & water etc. Real and ideal remote sensing.

Unit-2 Photo-Grammetry: Introduction, Types of Aerial Photographs, Basic principles of Photogrammetry, Geometry of a vertical aerial photograph, photographic Scale, Applications of vertical aerial photograph. Stereo-photogrammetry: Stereo models, Stereoscopic Vision.

Unit-3 Satellites and sensor, imaging and non-imaging sensor, Different satellite related with remote sensing. Digital Image Processing (DIP): Introduction, Preprocessing of image - Image interpretation, Geometric & Radiometric Correction, Image Enhancement. Microwave Remote Sensing Introduction, sensors, synthetic aperture RADAR, radar returns and image signatures, radar image characteristics, Remote Sensing Satellite Orbit- Geosynchronous orbit, Sun synchronous orbit, Thematic Image classification and information Extractions

Unit - 4 Global Positioning System: Definition, main segment, types, uses, nature and sources of errors in GPS signals.

Unit - 5 Geographical information system: Introduction, component of GIS, role of remote sensing and GIS in the Chhattisgarh region, Spatial Data information, Image Interpretation.

Reference Books

Remote Sensing - Principles & interpretation - F.F. Sabins

Digital Remote Sensing - Dr. P. Nag, Dr. M. Kudrat

Principles of Remote Sensing - P.J. Curran.

Remote Sensing principals and application- Dr. B. C. Panda

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05 JUL 2022

M.Sc. Rural Technology SECOND SEMESTER

Paper: RTL - 111

Credit: 02Marks: 100

Subject: Laboratory Course (Based on RT - 108 + 109)

1. Study of traditional plant and their part used as folklore medicine.
2. Study of locally available plants of families Asclepiadaceae,Apiaceae,Chenopodiaceae,Euphorbiaceae,Combritaceae,Liliaceae.
3. Nursery development, Preparation of biopesticides and biofertilizers.
4. Preparation of Hand embroidery,Agarabathimaking, Soft Toys making, Paper cover, Paper bag Envelop & File making, Manufacture of Utility items from waste, etc.
5. Visit to nearest medicinal nursery.
6. Visit and study of Industrial area.
7. Preliminary test of Medicinal Plants
8. Geographical corrections
9. Supervise classification
10. Unsupervised classification
11. Map preparations (.....)

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M.Sc. (Rural Technology SECOND SEMESTER
Paper: RTS – 112 Marks: 100 Credit: 02
SEMINAR

To make a power point presentation related with any topic of the course.

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05 JUL 2022

M.Sc. (Rural Technology) THIRD SEMESTER

Paper: RT – 113

Subject: Indigenous Art and Its Management

Theory Marks: 80

Internal Marks: 20 Total Marks: 100 Credit: 04

- Unit - 1 Introduction to Indian art, Art scope in Chhattisgarh, Various traditional arts and its importance in Chhattisgarh. Origin and history of Chhattisgarh traditional art, background, different technique related with Chhattisgarh traditional art.
- Unit - 2 Bell metal craft (Dhokara Art/Ghardwa Art) - Materials, Processes and techniques. Tribal Iron Art- Materials, processes, techniques and equipments.
- Unit - 3 Wooden art, Terracotta art and Bamboo art - Materials, Processes, techniques, equipments and applications. Stone Art.
- Unit - 4 Innovation in Design and Processes- Mixing of modern art with indigenous art, Creativity development in traditional art, required improvement in raw materials and equipment.
- Unit - 5 Economy and marketing- Marketing problems related with rural; art, present situation of rural artisans of Chhattisgarh state, role of different government and non-government organization in the development of rural artisans .

Reference Books

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M.Sc. (RuralTechnology) THIRD SEMESTER**Paper: RT - 114****Subject: Natural Product Management****Theory Marks: 80****Internal Marks: 20 Total Marks: 100 Credit: 04**

- Unit - 1 Definition, contribution of natural products for National Economy, important product of forest, and their role in rural economy and livelihood, utilization pattern of forest products.
- Unit - 2 Classification and use, Grasses, bamboos and canes, essential oils from grass, root and flower oils. Methods of extraction of essential oils, distillation, uses of oils, Role of oils and waxes in rural economy.
- Unit - 3 Tanes and it's uses - Wood tanes, bark tanes, fruit tanes and leaf tanes, Dyes- wood, bark, flower and fruit dyes, root dyes leaf dyes, animal dyes, uses of tannins and dyes in Rural industries.
- Unit - 4 Gums and resins- true gums, hard resins, oleo resins, utilizations of gums and resins, gum and resin tapping: Manufacturing of turpentine, Katha, catch and charcoal making.
- Unit - 5 Edible foods- leaves and young shoots, flower and young buds, fruits, seeds and nuts, bark and pith, gums, tubers, rhizomes and corms, nutritional value of important of edible food, Spacial food of bastarregen – Boda, imli, kaju, basta, mata, salfi

Reference Books

Non Timber Forest Product - S. Negi.

Forest Non - Wood Resources - A.P. Devadi.

Textbook of Food Science and Technology - Vijay Khader.

Preservation of Fruit and Vegetable - G.Lal, G.S.Siddappa and G.L.Tandon.

Food Preservation and Processing -M.Kalia and S. Sood

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M.Sc. (Rural Technology) THIRD SEMESTER**Paper: RT - 115****Medicinal Plant Production Techniques and Extraction Internal****Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04**

- Unit - 1 Definition , nature and scope of Ethno botany, development and future prospect of medicinal plants Natural Pesticides- Pyrethrum, Neem, Tobacco, natural antibiotics, allergenic extracts- pollen extract, fungal extract, dust, food extracts.
- Unit - 2 Medicinal uses; Cultivation and management of Medicinal plants - *Andrographis paniculata*, *Curcuma angustifolia*, *Plantago ovata*, *Catharanthus roseus*, *Chlorophytum borivilliam*, *Aloe barbadensis*, *Withania somnifera*, *Rauwolfia serpentina*, *Bixa orellana*.
- Medicinal uses; Cultivation and management of aromatic plants - *Citronella*, *Lemongrass*, *Mints*, *Palmarosa*.
- Unit - 3 Principles and methods of extraction, Theory of drug extraction, Extraction of aromatic plants Hydro-distillation, extraction with volatile solvent, super critical fluid extraction.
- Unit - 4 Introduction of Durg - Study of plant Drug containing Resins & Resin combinations, Cannabis, Capsicum, Asafoetida and Ginger. Study of Tannins & tannin containing drugs- Black Catechu, Arjuna, Volatile oils - and Terpenoid drugs, Alkaloids.
- Unit - 5 Ayurvedic dosage form- Classification, Extraction- Kwatha, Pachana, Avaleha, Bhawwan, Putapka, Fermentation- Asava & Arista, Arka, Guggulu, Ghita, Churna, Lepa, Vati & Gutikabhasma, Lauha. Plant product as crude drugs and use of Tribes of Chhattisgarh with special reference to Baiga, Plant in alternative system of medicine.

Reference Books

- Medicinal plants of India Vol 1 & 2 ICAR by Kirtikar & Basu.
- Compendium of Indian Medicinal Plants Vol 1-4 R.P. Rastogi & B.N. Mahrotra.
- "Indigenous medicinal specialties" Narayan Rao
- "Useful plant of Neotropical origin" Heing Brucher
- "Cultivation and utilization of Aromatic plants" C.K. Atal and B.M. Kapoor
- U.S. Narayan Rao, "Indigenous medicinal specialties"
- Heing Brucher "Useful plant of Neotropical origin"
- C.K. Atal and B.M. Kapoor "Cultivation and utilization of Aromatic plants"
- Pharmacognocny- Gokhale, Kokate & Purohit
- Herbal & Drug Industry - R.D. Ghosh
- Tutorial Pharmacy - Cooper & Gunn's

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M.Sc. (Rural Technology) THIRD SEMESTER**Paper: RT – 116****Food Science Technology & Value Addition in Natural Product****Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04**

- Unit - 1 Food Science- Introduction, functions of food, nutrition and nutrients, nutrient requirements, inter relationship of food, nutrition and health. Scope & job opportunities of food science. Govt. Schemes for food processing.
- Unit - 2 Meal Planning - Food groups, balanced diet, meal planning, importance of meal planning, factors affecting meal planning, modification of family meals for various age groups, need for special diet, Purchase and Storage of Food- Perishability of foods, quality indicators, selection, purchase and storage of food, food spoilage: causes and hazards, safe handling of food.
- Unit - 3 Preparation of Food - Need for cooking, pre-preparation of food, preparation of food, loss of nutrients, effect of heat on cooking, enhancement of nutritive value, effective use of leftover food. Household Equipment- Classification of equipment's, selection of household equipment's, care and maintenance of household equipment's.
- Unit – 4 Food Preservation - Meaning and need for preservation, principles of food preservation, household methods of food preservation, Importance & uses of Food Preservation.
- Unit - 5 Value addition: Jam, Jelly, Juice, Pickles; Beverage production of different fruit and vegetable. Rural cottage industries for preservation of food and their products.

Reference Books

Textbook of Food Science and Technology - Vijay Khader.

Preservation of Fruit and Vegetable - G.Lal, G.S.Siddappa and G.L.Tandon.

Food Preservation and Processing - M.Kalia and S. Sood.

Grain Management: To Ensure Food Security, Dr. Anupam Tiwari, Marks Books, New Delhi

Fruit Preservation- Principles and Methods - S.S.Srivastav - KitabMahal, Delhi

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M.Sc. (RuralTechnology) THIRD SEMESTER

Paper: RTL - 117 Marks: 100Credit: 02

Subject: Laboratory Course (Based on RT - 113 + 114 + 115 + 116)

1. Study of traditional plant and their part used as folklore medicine.
2. Distillation of oils from leaf, root, bark, wood and flowers.
3. Demonstration of different drying methods.
4. Improved methods of gum extraction.
5. Extraction of tans and dyes.
6. Creative design related with bell metal, Irish art, terracotta art & wooden
7. Nursery development, Preparation of bio pesticides and bio fertilizers.
8. Preparation of Jelly, Jam and ketchup.
9. Preparation of Amlamurabba and mouth freshener.
10. Preparation of pickles - Mango, Amla, Citrus.
11. Preparation of Squash and Sharbat.
12. Visit to nearest Nursery farm.
13. Visit and study of Medicinal plant based Industries.

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M.Sc. (Rural Technology) THIRD SEMESTER

Paper: RTS - 118 Marks: 100 Credit : 02

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To make a power point presentation related with any topic of the course.

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M.Sc. (Rural Technology) FOURTH SEMESTER

Paper: RT - 119

Subject: Rural Infrastructural Engineering

Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04

- Unit - 1 Rural Infrastructural Engineering: Nomenclatures and their meanings, Role and Responsibilities of Construction Supervisor. Introduction to drawing- Importance of Drawings, Types & Scales of Drawing, Types of Surveying, Leveling.
- Unit - 2 Building Construction Work - Introduction to Building Material, Need of foundation Site, Inspection and Marking, Digging and Filling (Earthwork), Brick Work, Concrete Work, Roof Work. Cost estimation of building. Drainage and Sewer Construction, Finishing and Polishing, Flooring, Wood and Iron Work, Type of Rural Housing: Brief study about design, pattern of bamboo house, mud house, wooden house, and other low cost housing structure
- Unit - 3 Road work - Formation level of roads, Main part of the roads, Sub grade and compaction, Types of roads, Construction of cement concrete road. Condition of rural roads, Govt. Schemes for rural road.
- Unit - 4 Rural infrastructure - Rural Health & Sanitation - Rural Health care - objectives , Sanitation & Water supply Potable and Non - potable water , Purification of water to make it suitable for drinking, utility of water , conservation of water and rain water Harvesting , various appropriate technologies for providing potable drinking water, importance of water sanitation in rural health.
- Unit - 5 Rural administrative department work: project work related with Panchyat, rural engineering, service and PHE department. Govt. Schemes for Rural Health, Sanitation and rural housing.

Reference Books

Gurcharan Singh, Building Materials, Standard Publishers Distributors, Delhi
Rangwala S.C. , Engineering Materials, Charotar Publishing House Pvt. Ltd. , Adand.
Mittal D.C. , Engineering Materials.
Rangwala S.C, Water Supply & Sanitary Engineering, Charotar Publishing House (P) Ltd. ,
AnandGurcharan Singh, Water Supply & Sanitary Engineering, Standard Publishers
Distributors, Delhi Garg S.K. , Water Supply Engineering, Khanna Publishers, Delhi
Gupta D.V. , Water Supply & Sanitary Engineering, Asian Publishers, Muzaffarnagar.
Gurcharan Singh, Building Materials, Standard Publishers Distributors, Delhi
Rural Socieology - B.D.Tyagi
Social Development -V. S. Parthasarathi Gore M.S.
Introduction of Rural settlement- R.B. Mandel
Rural Develoment: Some Factors, NIRD Hyderabad.

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M.Sc. (Rural Technology) FOURTH SEMESTER**Paper: RT – 120****Subject: Soil and Water Conservation Engineering****Theory Marks: 80 Internal Marks: 20 Total Marks: 100 Credit: 04**

Unit - 1 Definition of soil and soil engineering. Soil as a three phase system, Soil - Plant - Water relationship, Water content, density, void ratio, porosity and degree of saturation. Soil conservation techniques, Collection of Soil, Testing of soil for different purposes, Soil Improvement methods,

Unit - 2 Water resources of India and their utilization, water cycle, water law, watershed management concept, principle, types of watershed, basic concept of water quality assessment, outcome based watershed management model, integrated watershed management program, various terminologies used in watershed management.

Unit - 3 Concept of Irrigation, Types of Irrigation, Source of irrigation water. Water lifting devices, Irrigation methods and efficiencies, water measuring devices and Conveyance systems.

Unit - 4 Design of irrigation canals, Various types of canal lining - Advantages & Disadvantages , Canal Head Works: - Definition, object, general layout, functions of different parts, Brief study Water Conservation Rules by Govt.

Unit - 5 Surface drainage of agriculture land, sub surface drainage, basic concept of Aqueduct, Siphon, Super passage, Level crossing, inlet and outlet .

Reference Books

Introduction to soil and water conservation engineering, Mal, B.C, Kalyani publishers

Handbook of Agriculture: ICAR, Publication.

Irrigation Engineering- Agarwal G.D. , B. Bharti Prakashan, Merrut.

Irrigation Engineering, - Modi P.N. , Standard Book House, Delhi.

Irrigation Engineering- Dr. Bharat Singh, Nem Chand & Bros. , Roorkee

Introductory Soil Science, Dilip Kumar Das, Kalyani Publishers

Introduction to soil and water conservation engineering, Mal, B C, Kalyani publishers

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M.Sc. (Rural Technology) FOURTH SEMESTER

Paper: RT – 121

Subject: AQUACULTURE

Theory Marks: 80

Internal Marks: 20

Total Marks: 100

Credit: 04

Unit - 1 Ichthyology and its scope, types of carp fishes and their characteristic features, common major and minor carps found in Chhattisgarh, larvivorous fishes, ornamental fishes.

Unit - 2 Exoskeleton: scales, coloration, Lateral line system, Food, feeding behavior and digestion in fish, respiratory organs: aquatic and air breathing, swim bladder, breeding of fish, fish seed resources and their transportation; Common disease of fish and their cure.

Unit - 3 Chemical composition of fish; economic value of fish; fish preservation and processing; preparation and maintenance of aquarium, planktons and their importance.

Unit - 4 Fisheries and its various classification: Overview of Inland, Estuarine and Marine fisheries; Fish culture in ponds and management; Composite fish farming, cage culture and use of sewage for fish culture; Integrated fish farming; fishing crafts and gears; Government schemes/programs related to fish culture.

Unit - 5 Prawn culture and processing; Pearl culture; technical and economic aspects.

Reference Books

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M.Sc. FOURTH SEMESTER
Paper: RTD – 122Marks: 200Credit: 08
Dissertation work

The dissertation work allotted in the start of third semester. The dissertation examination will be conduct in the end of fourth semester. The dissertation work should be related with any topic of the course.

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A handwritten signature in blue ink, consisting of a large, sweeping loop followed by a few smaller strokes, positioned above the 'Member' label.

