

**DEPARTMENT OF RURAL TECHNOLOGY
SYLLABUS**

Revised Pre-Ph.D. Course Work (One Semester)

(Effective from Academic Session 2020-2021)

Course Contents

The course work shall consist of the following

1. Core course
2. Elective Course

Core course shall be mandatory for all students and the total number of credit for the core and elective course shall be 15 with following pattern

| Code | Title of the Course | Theory (External+ Sessional) | Term Paper | Practical | Total Marks |
|--------------------------------|--|---------------------------------|---------------|-----------|----------------|
| Core Course | | | | | |
| SOA/ RT/ C101 | Research Methodology and Publication Ethics (RPE) | 3 (60+20) | - | 1(20) | 4(100) |
| SOA/RT/ C102 | Water Conservation and Harvesting Methods | 2(60+20) | 1(20) | - | 3(100) |
| Elective Course | | | | | |
| Elective Course-I | Energy Resources and its Development | 3(60+20) | 1(20) | - | 4(100) |
| Elective Course-II | Post- Harvest Technology of Fruits and Vegetables | 3(60+20) | - | 1(20) | 4(100) |
| Elective Course-III | Rural Tourism: Concepts and Approaches | 3(60+20) | 1(20) | - | 4(100) |
| Elective Course-IV | Application of Remote Sensing and GIS | 3(60+20) | - | 1(20) | 4(100) |

Note: Two Core courses are compulsory and out of 4 elective, students must select any two depending on the availability of faculty. The total number of credits for the core and elective courses shall be 15 with the following pattern.

- (a) Core Course:- Two courses (4+3 credits) = 7 credits
 (b) Elective Course:- Two courses (4+4 credits) = 8 credits
Total Credits = 15

Course Contents For Pre-Ph.D Program in Rural Technology Core Courses

SOA/RT/C101: RESEARCH METHODOLOGY AND PUBLICATION ETHICS (RPE) 4(3+1)

Part: A: Research Methodology

Research Studies: Meaning, objectives, nature and scope of research, types of research: Participatory, research technique, research process in rural development & management, criteria of good research.

Sampling techniques: Meaning and importance, steps in sampling design, criteria for selecting a sampling procedure, characteristics of good sampling design, different types of sample design.

Development of Tools and Data Collation: Collection of primary & secondary data questionnaires, interview schedules case study and FGDs.

Presentation of Data: Graphic & diagrammatic representation its nature and scope.

Basic Statistics: Definition and scope of statics, variables, frequency & tabulation and classification of data and analysis, Distribution, measures of central tendency, measures of dispersion and correlation, regression and association of attributes.

Testing of Hypothesis: Testing of small samples, i.e. t-test, Z-test, X^2 test, Sign Test, testing of large sample F-test. Analysis of Variance and Covariance: Basic principles of one-way ANOVA, two-way ANOV A and ANCOV A). Multivariate analysis techniques (Characteristics and applications, classification of Multivariate analysis, important multivariate techniques, important method of factor analysis).

Part: B: Publication Ethics

Philosophy and Ethics: Introduction to Philosophy: definition, nature and scope, concept, branches. Ethics: definition, moral philosophy, nature of moral judgements and reactions.

Scientific Conduct : Ethics with respect to science and research. Intellectual honesty and research integrity. Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP). Redundant publications: duplicate and overlapping publications, salami slicing. Selective reporting and misrepresentation of data.

Publication Ethics: Publication ethics: definition, introduction and importance. Best practices / standards setting initiatives and guidelines: COPE, W AME, etc. Conflicts of interest. Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice -

versa, types. Violation of publication ethics, authorship and contributorship. Identification of publication misconduct, complaints and appeals. Predatory publishers and journals.

Practicals:

Part A: Research Methodology: Designing of field experiment and their analysis.

Part B: Open Access Publishing: Open access publications and initiatives, SHERPA/ RoMEO online resource to check publisher copyright & self- archiving policies. Software tool to identify predatory publications developed by SPPU. Journal finder journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc

Publication Misconduct : Group Discussions. Subject specific ethical issues, FFP , authorship. Conflicts of interest. Complaints and appeals: examples and fraud from India and abroad

Software tools : Use of plagiarism software like Turnitin , Urkund and other open source software tools.

Databases and Research Metrics:

Databases : Indexing databases. Citation databases: Web of Science, Scopus, etc.

Research Metrics : Impact Factor of journal as per Journal Citation Report , SNIP , SJR, IPP , Cite Score. Metrics: h- index , g index , i IO index , altmetrics

**SOA/RT/C102: WATER CONSERVATION AND HARVESTING METHODS
3(2+1)**

Water Conservation Methods for Crop Land: Broad bed and furrow system (bbf), ridging and tied ridging, contour furrow, inundation methods

Treatment of Catchment: Natural catchments and minor changes, shaping catchments.

Small Storage Structures: Introduction: Objectives and data required, types of storage structures, design data required,

Small Earth Dams: Planning earth dams, spillways, the embankment or dam wall, construction sequence, computation of storage capacity, common terminologies, small weirs, sand dams.

Drought Farm Pond: Selection of site, construction, nala-bunding,

Off- stream Storage: General, rectangular tanks, ring tanks, turkey's nest tank,

Losses of Developing Groundwater: Groundwater recharge, groundwater extraction,

Water Harvesting for Trees and Shrubs: General methods and techniques

Practical/Term paper: instead of practical there will be term paper/seminar.

SOA/RT/E103: ENERGY RESOURCES AND ITS DEVELOPMENT

4(3+1)

Solar radiation and its Measurement: Introduction, solar constant, solar radiation at the earth's surface, solar radiation geometry, solar radiation measurements, solar radiation data, estimation of average solar radiation.

Solar Energy Collectors: Introduction, physical principles of the conversion of solar radiation into heat, flat- plate collectors, concentrating collector: focusing type, advantages and disadvantages of concentrating collectors over flat-plate type collectors.

Solar Energy Storage: Introduction, solar energy storage systems, solar pond.

Applications of Solar Energy: Introduction, solar water heating, space-heating(or solar heating of buildings), space cooling (or solar cooling of buildings), solar thermal electric conversion, solar electric power generation: solar photo-voltaic, agriculture and industrial. Process Heat, Solar Distillation, Solar Pumping, Solar Furnace, Solar Cooking, Solar Green House.

Wind Energy: Basic Principles of wind energy conversion, Basic components of a WECS (wind energy conversion systems), advantages and disadvantages of WECS, limitations.

Practical/Term paper: instead of practical there will be term paper/seminar.

SOA/RT/E104: POST- HARVEST TECHNOLOGY OF FRUITS AND VEGETABLES

4(3+1)

Introduction post harvest physio-biochemical changes; causes of post harvest losses, control of post harvest losses- proper cultural operations, pre-storage treatments, transportation, storage, environmental control, ionizing radiation, post harvest chemical treatments, storage of fresh fruits and vegetables, factor affecting storage quality, storage disorders, marketing of fruits and vegetables and their products.

Principles of preservation- temporary and permanent; Spoilage of fruits and vegetables, vitamins and other nutrients in preserved products, food additives and their use in preservation. Principles and guidelines for establishing processing unit.

Containers: Types, merits and demerits, composition and manufacturing of tin and glass containers, failures in glass containers, general principles and procedures of canning and bottling, spoilage of canned products.

Principles and methods of jam, jelly and marmalade; juice extraction equipments, general methods of preparation and preservation, unfermented fruit and vegetable beverages and their preservation. Preparation of pickles, chutneys, sauces, ketchup, soup from suitable fruits and vegetables, causes of spoilage.

Preservation by freezing- objectives, freezing and growth of micro-organisms, freezing process, storage of frozen products; exposure on preservation by radiation. Government policies, regulation and specifications for fresh and processed products.

SOA/RT/E105: Rural Tourism: Concepts and Approaches
4(3+1)

Rural Tourism: Understanding of rural tourism, definition, features, destination typology (agri tourism, eco tourism etc.) and history .

Rural Tourism Resources and Product Design: Characteristics and activities of rural tourism, Impact of rural tourism, principles for rural tourism, criteria for success in rural tourism.

Planning and Management of Rural Tourism: community participation in rural tourism, marketing of rural tourism. Popular rural tourism destination in India case study

Rural Tourism Scenario in India: meaning and definition of rural tourism, adaptation, role of department of tourism, Govt. of India. Current status and future prospectus, issues and challenges in development and promotion of rural tourism in India.

Practical/Term paper: instead of practical there will be term paper/seminar.

Rural Tourism in Uttarakhand: Role of Uttarakhand Tourism Development Board (UTDB) in rural tourism, development and promotion, Case study of popular rural tourism villages of Uttarakhand

SOA/RT/E106: Application of Remote Sensing and GIS
4(3+1)

Basic concepts of remote sensing and Geographic Information System (GIS), Determination of geomorphologic, physiological, vegetation, soil, land use parameters of a watershed, Spatial and non-spatial analysis, Preparation of thematic layers and their digitization.

Practical: Thematic layer built up, overlaying and their interpretations using ERDAS and ARC/INFO software packages. Interpretation of satellite data and digital image processing, Preparation of thematic maps.