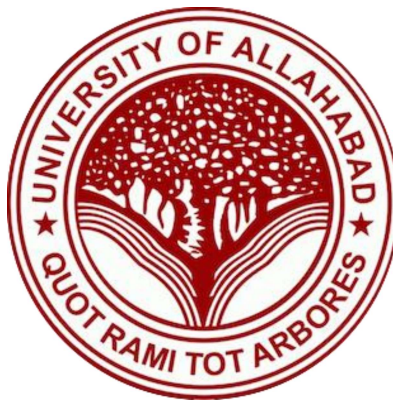


**Centre
of
SCIENCE AND SOCIETY**

**{M.Sc. Design and Innovation in Rural Technology
(Four Semesters) Programme}
(Syllabus)**



**UNIVERSITY OF ALLAHABAD
PRAYAGRAJ: 211002**

**ORDINANCE FOR M.Sc. DESIGN AND INNOVATION IN RURAL TECHNOLOGY
BASED ON SEMESTER SYSTEM, IIDS, FACULTY OF SCIENCE
UNIVERSITY OF ALLAHABAD**

1. The admission to the course of M.Sc. degree in Design and Innovation in Rural Technology open to any candidate who has earned Bachelor degree under 10+2+3 pattern of education with Botany, Agriculture sciences discipline of any Indian University or any accredited institution or any foreign University which the academic council of the University of Allahabad may recognize from time to time for this purpose.
2. The candidates shall be admitted through the entrance test conducted by the University followed by Group discussion and Personal Interview at the Centre in the ratio of 60:40 (60% marks entrance test conducted by University, 30% group discussion and 10% for Personal interview). There shall be separate merit lists for General, SEBC (OBC) and SC/ST candidates.
3. The total number of the candidates admitted to this course will be 15 (Fifteen) and the number may vary from time to time according to the directives of the University.
4. The course shall consist of theory papers and practical based on these papers spread over four semesters.

**RULES AND REGULATIONS
EXAMINATION, EVALUATION AND THE MARKING SYSTEM**

AS PER CBCS RULE

OBJECTIVE

ORIGIN-To begin with a course dedicated towards overall development of rural technology, the Centre of Science and Society (Rural Technology and Development) {M.Sc. (Four Semesters) Programme} under the Coordinator-ship/ Directorship (Honorarium basis) University of Allahabad, efforts will made to retrieve funds under **CSR** (Corporate- Social Responsibility) from Coal India, NTPC, IFFCO, and Private Industry viz., Kirloskar, Mahindra Tractors, Monsanto etc. In addition to this, the Ministry of Rural Technology and Ministry of Small and Medium Scale Industries, Govt. will also render support in establishing an independent Centre of Science and Society (Rural Technology and Development) which will incorporate advancement of technological and social aspect of rural development.

OBJECTIVES AT A GLANCE

- Assessment of rural area and people.
- Rural Entrepreneurships (self-employment through sericulture, lac farming, flower farming, mushroom culture, bee keeping, preparation of natural dyes, bio composting, E-waste management, Biofertilizers etc.).
- Safe and eco-friendly technologies promotion and their compatibility amongst villagers.
- Conservation and promotion of indigenous knowledge.
- Socio-nutritional-economic development of indigenous peoples through appropriate integrated technology and awareness.
- Generating awareness regarding government policies (monitoring and documentation).
- Rural planning and implementation of rural development projects.
- To develop skill in students to for aforementioned tasks.

SUMMARIZED SYLLABUS WITH MARKING SCHEME AND CREDITS

SEMESTER- I

Course no.	Marks	Course title	Credits
DRT- 501	100	Introduction to Design and Innovation in Rural Technology and development	3
DRT- 502	100	Rural Empowerment	3
DRT- 503	100	Innovation, Concept and Models of Rural Development	3
DRT- 504	100	Global approach in Innovative Rural technology	3
DRT- 531	100	Practical of DRT- 501 and DRT- 502 (Training programme/Project work)	4
DRT- 532	100	Practical of DRT- 503 and DRT- 504 (Village Exposure)	4
Total			20

SEMESTER- II

Course no.	Marks	Course title	Credits
DRT- 505	100	Natural resource management practices in India	3
DRT- 506	100	Innovative technologies in Production and Post-harvest management	3
DRT- 507	100	Innovation in productivity and Sustainable management	3
DRT- 508	100	Design and Innovation Commercial Production Technologies	3
DRT- 533	100	Practical of DRT- 505 and DRT- 506	4
DRT- 534	100	Practical of DRT- 507 and DRT- 508	4
Total			20

SEMESTER- III

Course no.	Marks	Course title	Credits
DRT-601	100	Design and Innovation in Rural Entrepreneurship	3
DRT- 602	100	History of Indian traditional Medicine	3
DRT- 603	100	Science, Technology and Society Interaction	3
DRT-604	100	Design and Innovation in Integrated Rural Health Management	3
DRT- 635	100	Practical of DRT- 601 and DRT- 602 (Medical based Field work survey)	4
DRT- 636	100	Practical of DRT- 603 and DRT- 604 (Village Survey for Endemic Diseases)	4
Total			20

SEMESTER- IV

Course no.	Marks	Course title	Credits
DRT- 605	100	Economic status of Rural India	3
DRT- 606	100	IT in Rural Development	3
DRT- 607	100	Dissertation/Thesis/Prototype development	5
DRT 651-DRT-654	100	Elective Papers	3
DRT-638-DRT-641	100	Practical based on Elective Papers	2
DRT- 637	100	Practical of DRT- 513 and DRT- 514	4
Total			20

Elective Papers

Course Code	Marks	Elective*	Credits
DRT 651	100	Innovation in Rural Entrepreneurship	3
DRT 652	100	Rural Health Management	3
DRT 653	100	Innovative Commercial Production Technologies	3
DRT 654	100	IT in Rural Development	3
DRT 638	100	Field Work based on Course DRT 651	2
DRT 639	100	Field Work based on Course DRT 652	2
DRT 640	100	Field Work based on Course DRT 653	2
DRT 641	100	Field Work based on Course DRT 654	2
Total			20

DETAILED SYLLABUS FOR THE 2- YEAR POST- GRADUATE COURSE DESIGN AND INNOVATION IN RURAL TECHNOLOGY

SEMESTER- I Syllabus

DRT 501- Introduction to Design and Innovation in Rural Technology and development

- UNIT- I** Indian Rural society – Nature and Characteristics, Factors of Indian Society, Tribal, Rural, Urban-Rural Urban continuum. Sustainable Development, Social Welfare, Social Work
- UNIT- II** Demography of rural areas, British setup and independent Indian setup, Rural Social structure, Problems of Weaker Sections, Social Problems in India: Population Explosion, Unemployment, Poverty, Gender Discrimination and Inequality, Farmers' suicide, Violation of Human Rights and Women in rural society.
- UNIT- III** Educational and cultural setup in various parts of the country, administrative setup, link up with district headquarters, Andragogy and Pedagogy.
- UNIT- IV** Rural Institutional Systems, Religious, Concept, Nature, Function and its Changing Structure, Education, Objectives, Functions and Importance, Cooperation, Concept, Nature, Scope, Role and Significance in Rural Development.
- UNIT-V** Computer Fundamentals, MS-Office, Data analysis and Interpretation

DRT 502- Rural Empowerment

- UNIT- I** Great Educators and their methods: Upanishadic Rishis, Booker Education in Rural areas, Education with emphasis on Primary and secondary education. Major Social Reformers and their Work: Raja Ram Mohan Roy, Mahatma Jyotibha Phule
- UNIT- II** Brief History of Adult Education- influence of Paulo Frere Pre-Independence and Post Independence efforts in India, Adult Education Programme since 1978 and latest Development.
- UNIT- III** Concept of Rural technology development, Scope of Rural technology, Causes of Rural Backwardness, Need for Rural technology Development and its Constraints.
- UNIT- IV** Rural Education with emphasis on Primary, Adult and Community Education, Development of Rural Women and Children- Status and Development Strategies
- UNIT-V** Different education commissions of India and their recommendations.

DRT 503- Innovation, Concept and Models of Rural Development

- UNIT-I** Innovation, Definition and Basic concepts. Types and Generation of Innovative Models.
- UNIT-II** System of Innovation, Components and Characteristics, Indian and International Innovation Institutions, Participatory Rural Appraisal (PRA),
- UNIT-III** Paradigms of Rural Development- Lewis Model of Economic Development, Self Help Group, Concept, Characteristics and Functions, National Rural Livelihood Mission (NRLM), DDU-GKY, Salient features, Nature and Scope.
- UNIT-IV** Experiments in Rural Development before independence: Sriniketan, Martandam, Sevagram, Baroda, Firka Development, Nilokheri and Etawa Pilot Project.

UNIT-V ‘Big Push’ theory of Development, Myrdal’s thesis of ‘Spread and Backwash Effects. Gandhian Model

DRT 504- Global Approach in Innovative Rural technology

UNIT- I Concept of rural technology and growth in general, Distinction between growth and Development, Indicators of Development, Measures of Development.

UNIT- II Poverty and Unemployment Rural Development and Environmental Protection, Participatory rural development.

UNIT-III Rural development Experiences in Asian countries - Need of Rural Development in Asian Countries, Sustainable Rural Development and Globalization.

UNIT-IV Success of Grameen Model in India, approaches to Rural Development in India.

UNIT- III Role of Panchayati Raj Institutions in Rural Development with special reference to Indian constitution. Different Rural Commissions of India, Land Acquisition Bill.

DRT 531- Practical of DRT- 501 and DRT- 502

Exposure visit to a village and preparation of report. Exposure visit to a State Agricultural University. A case study on the beneficiaries of any rural development programmes. A compulsory exposure for training programme/project work.

DRT 532- Practical of DRT- 503 and DRT- 504

Exposure visit to any NGOs/Govt. agencies engaged in rural development activities. Conducting socio-economic surveys in the villages to understand the social structure, tribal social system, their values and norms. Survey of a village to find out the major problems. Identification of social changes in the villages.

SEMESTER- II Syllabus

DRT- 505- Natural resource management practices in India

UNIT- I Types and classification of natural resource, factors influencing resource availability, ecological, social and economic dimension of resource management

UNIT- II Land resources: Land as a resource. Dry land, land use classification, land degradation, man induced landslides, soil erosion and desertification.

UNIT-III. Forest resources: forest vegetation, status and distribution, major forest types and their characteristics. Uses, over-exploitation, deforestation and case studies. Timber extraction, mining, dams and their effects on forest and tribal people, forest management.

UNIT-IV- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Water ecology and management.

UNIT-V - Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

DRT- 506- Innovative technologies in Production and Post- harvest management

- UNIT- I** Plant Protection - Plant disease, Plant pests' needs for its control, biological control of pests. Integrated Weed management. Agricultural Development under the Plans, Organizational Aspects of Agriculture: Land Reforms, Agro-forestry
- UNIT- II** Impact of Information Technology on development, growth and governance, satellite communication and remote sensing, geo-informatics application, geospatial information technologies, Information Technology in Agriculture,
- UNIT- III** Rural Industrialization- Concept, Importance of Rural Industrialization, Village and Cottage Industries, Livestock production, breeding and maintenance (poultry, goattry and piggery).
- UNIT- IV** Importance and scope of vegetables in India. Identification of vegetables & their seeds, improved nursery raising, sowing & transplanting of vegetables.
- UNIT- V** Aquaculture and Fisheries industry in rural setup specially culture and rearing of Carp, Prawn, Poly culture, Pearl culture etc. Different government schemes related to fisheries.

DRT- 507- Innovation in Productivity and Sustainable Management

- UNIT- I Basic Botany-** Classification, Morphology and Anatomy of Plants, Main fruits grown in rural places, Orchard Management practices, Processing and marketing of fruits,
- UNIT- II** Preparation of Nursery, Importance of cultivation of selected medicinal and aromatic plants. Propagation, planting methods, Bonsai Technology.
- UNIT- III Bee-keeping:** Detailed study of honey bee, its various species and their habits, Rearing techniques of honey bee, Difference between traditional and modern bee keeping. Care and management of bee hive, bee wax and honey; and their utility. Economics of bee keeping.
- UNIT- IV Lac Culture and Sericulture:** Cultivation, species, Importance, management of pests & diseases and Marketing.
- UNIT- V** Different emerging rural industrial technologies, their applications: Horticulture, Floriculture, Pomology, Olericulture; production and possibilities in global economy etc.

DRT- 508- Design and Innovation in Commercial production technologies

- UNIT- I** Commercial production technologies-nature, concept, applications and recent technical advancement.
- UNIT- II Mushroom Cultivation:** Morphology and life-cycle, Importance of mushroom as a health food, a cash crop and eco- friendly commodity, Wild and cultivated mushroom, Edible and poisonous types, Tropical and temperate species, Mushroom spawns, media and substrate for different species.
- UNIT- III Biofertilizers:** Bacterial, algal and fugal, Production technology and post-harvest handling of fresh and processed products and their marketing.
- UNIT- IV Vermicomposting:** Principles and functions of Vermicomposting, Biological mechanism of Vermicomposting, large- scale and small- scale production of vermicomposts.
- UNIT- V Biopesticides and Bio-supplements;** herbal soaps, fumigants and hygienic products.

DRT- 533- Practical of DRT- 505 and DRT- 506

Identification of various crops of kharif, rabi and zaid season and seed requirement. Familiarization with various chemicals like- fertilizers, pesticidals, herbicides, insecticides and fungicides. Calculation of fertilizer and pesticides doses. Use of farm implements & equipments. Identification of some important weeds, diseases and pests. Working at organic plots. Analysis of decomposition patterns of animal waste & agro-residuals. Nutrient value of common animal wastes and agro-residues as potential manures.

DRT- 534- Practical of DRT- 507 and DRT- 508

Bee-keeping: Identification and use of commonly used equipments in bee keeping, Identification of queen, drone and worker cells, Occupants of bee colony and the role of individual. Lac Culture, Tasar culture and Sericulture: Identification and description of various host plants of lac, tasar and sericulture, Rearing of lace, tsar and silk worm and cocoon maintenance. Mushroom Cultivation: Pure culture of mushroom---preparation and maintenance of inoculum Dairy: Substrate formulations, composting and pasteurization. Vermicomposting: Preparation and demonstration.

SEMESTER- III Syllabus

DRT- 601- Design and Innovation in Rural Entrepreneurship

UNIT- I Entrepreneurship: Concept of Entrepreneurship, origin and Development of Entrepreneurship. Entrepreneurship Movement in India, role of entrepreneurship in economic development.

UNIT- II Small Industries Development corporation (SIDC), Small Scale industries Board (SSIB), State Small Industries Development Corporations (SSIDC), Technical Consultancy Organizations (TCOs).

UNIT- III Rural Entrepreneurship: Meaning of rural entrepreneurship, need for rural entrepreneurship, problems of rural entrepreneurship, NGOs and rural entrepreneurship, Training and Development of rural Entrepreneurs.

UNIT- IV 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, STARTUP, SEED, PMKVY, TREAD, STEP, ATAL INNOVATION MISSION, MAKE IN INDIA, PRISM, Project Formulation and Appraisal.

UNIT- V Agencies Supporting Entrepreneurs: District Industries Centre (DICs), Micro, Small and Medium Enterprise (MSME), National Small Industries Corporation (NSIC)

DRT 602- History of Indian traditional Medicine

UNIT- I History of Indian system of medicine viz. Ayurveda, Siddha, Surgery etc.

UNIT- II Different methods for prevention of diseases, use of medicinal plants in rural areas.

- UNIT- III** Simple physical and breathing exercise, Acupressure, yoga and other techniques based on traditional knowledge and wisdom for sound health and sound mind.
- UNIT- IV** WHO's approach to deal with Rural Health and Sanitation, Personal hygiene and environmental hygiene, Sanitation programme and implementation, Appropriate treatment against serious acute ailment such as diarrhoea, dehydration, and health care for the vulnerable groups.
- UNIT- V** Local health traditions, primary health care, medicinal plant garden for conservation and utilization of medicinal plants; Scientific documentation of traditional and indigenous knowledge related to plants used for healthcare.

DRT- 603- Science, Technology and Society Interactions

- UNIT-I** Concept of Science: Nature of scientific knowledge. Scientific method, demarcation between science and non science, Scientific temper vs. humanistic temper.
- UNIT-II** Science, Technology and Culture; Science and Politics, Public Understanding of Science, Science and Religion, Science and Ethics
- UNIT-III** Technology – Society Interface: Techno science, Social Construction of Technology, Gender and Technology, Innovation and its impact in the society
- UNIT-IV** Development of Science in India: Pre-colonial Science; Colonial science; Science in Post Independent India; Origin and growth of scientific institutions and societies in India; Evolution of S&T Policy.
- UNIT-V** Innovation and Intellectual Property Rights: Pre-IPR system of protection- Secrecy/Trade guilds/Cartels; Basic forms of IPRs- Patent, copyright, trademark, Industrial design; TRIPS, IPR in India; Traditional knowledge, IPR and Benefit sharing, Indigenous knowledge and its appropriation IPR & Traditional Medicine, Private vis-à-vis community based ownership, Bio piracy, Breeders vis à-vis Farmers rights.

DRT 604- Design and Innovation in Integrated Rural Health Management

- UNIT-I** Safe Drinking water, Concept and need, Rural Technology to get safe drinking water, Different schemes and programmes.
- UNIT-II** Women health in Rural India; factors, Sex ratio. Health neglect and its changing scenario in the context of government programme. Mortality and morbidity factors, influencing nutrition and health.
- UNIT-III** Government Health insurance schemes, bank insurance, smart card for BPL families. Various schemes for family, including free vasectomy, single girl child reward, etc.
- UNIT-IV** Community Health centre schemes and government hospital schemes for poor.
- UNIT-V** Corporate Social Responsibility: Evidences and The practice of CSR in the context of rural development in India.

DRT 635- Practical of DRT)- 601 and DRT- 602

Health: Practice of physical and breathing exercise, acupressure and yoga. Identification and use of some commonly available medicinal plants. First aid techniques for common injuries and

accidents. Visit to a community health centre, primary health centre and sub centre. Preparation of ORS. A field work survey for health care

DRT- 636- Practical of DRT- 603 and DRT- 604

Human Nutrition and Nutrition Education. Preparation of a balanced and nutritional value chart for commonly available fruits and vegetables Safe Drinking water: Preparation of water filter using locally available materials, Use of lime, alum etc. to purify water. Sanitation: Construction of soak pit, garbage pit, Visit and study of different components of low cost latrines and its construction, Preparation of posters and leaflets for awareness programme. Reporting and recommendation of various human diseases in Rural Area.

SEMESTER- IV Syllabus

DRT- 605- Economic status of Rural India

UNIT- I Unemployment and Underemployment in Rural Areas- Problems, Causes.

UNIT- II Poverty- Causes of Rural Poverty, Poverty alleviation programmes in India- Success and Failure analysis. Poverty alleviation through Micro Finance

UNIT- III Empowerment of Rural Women through Self Help Groups. Commercial Banks, Cooperative Banks, NABARD, Rural Insurance.

UNIT- IV Component and classification of rural markets, Rural credit Institutions, Problems in Rural marketing, rural demand. Finance schemes related to economics, Rural Credit – Sources of Credit, Institutional and Non- Institutional, Institutional Credit for Rural Development in India.

UNIT- V Civil Society and NGO Management, Understanding Civil Societies, Role of Civil Societies, Administrative and financial structure of NGOs, Guideline for NGO Management, NGOs as Society, NGOs as non-profit company, NGOs as Trust.

DRT 606-IT in Rural Development

Credits: 3

UNIT-I Elementary knowledge about computer hardware and software, operating system, MS-Office.

UNIT-II Data analysis and appropriate software, Different graph type, operating SPSS

UNIT-III Numerical methods of Data Presentation: Mean, Median, Mode, Standard deviation, Correlation, Correlation, Regression, Chi Square Test.

UNIT-IV Audio-Visual Aids: Materials and Equipment-Planning Preparation and use of different types of audio-visual aids-Projectors Films-Tape recorder Television.

UNIT-V Introduction of GIS and its components-spatial data organization and management, Remote sensing and its application in rural development.

DRT 607: Dissertation / Thesis / Prototype development

The topic would be decided by the candidate in consultation with the respective supervisor. Dissertation / thesis will be based on existing branches of botany and the title will be decided keeping the view on the modern aspect in the related discipline. It will be the part of semester IV; however, the title of dissertation / thesis will be assigned by concerned faculty member/board in the beginning of semester III to provide sufficient time to complete dissertation / thesis.

DRT- 637- Practical of DRT- 605 and DRT- 606

To identify the causes of rural unemployment through survey in villages. Measurement of farm holdings with special reference to land situation and study of land ownership pattern. To study a functional SHG(Self Help Group) to understand method and procedure, record-keeping, linkages and income generating activities. Study of a village market to analyze the marketing chain and its functioning.

Elective Papers- (There shall be four elective papers, and student has to opt only one)**DRT 651: Innovation in Rural Entrepreneurship****Credits: 3**

UNIT I: Entrepreneurship: Concept, knowledge and skills requirement; characteristic of successful entrepreneurs; role of entrepreneurship in economic development; entrepreneurship process; factors impacting emergence of entrepreneurship; managerial vs. entrepreneurial approach and emergence of entrepreneurship

UNIT II: Starting the venture: generating business idea – sources of new ideas, methods of generating ideas, creative problem solving, opportunity recognition; feasibility study – market feasibility, technical/operational feasibility, financial feasibility; drawing business plan; preparing project report; presenting business plan to investors, STARTUP, SEED, PMKVY, TREAD, STEP, ATAL INNOVATION MISSION, MAKE IN INDIA.

UNIT III: Functional plans: marketing plan – marketing research for the new venture, steps in preparing marketing plan, organizational plan – form of ownership, designing organization structure, job design, manpower planning; Financial plan – cash budget, working capital, Performa income statement Performa cash, perform balance sheet, break even analysis.

UNIT IV: Sources of finance: debt or equity financing, commercial banks, venture capital; financial institutions supporting entrepreneurs; Intellectual Property Rights.

UNIT V: Rural Entrepreneurship: need for rural entrepreneurship, problems of rural entrepreneurship, NGOs and rural entrepreneurship, Training and Development of rural Entrepreneurs

DRT-652: Rural Health Management**Credits: 3**

UNIT I: Health Education, health planning & management, school health, health economics Information System, hospital waste management, Disaster management.

UNIT II: Health Status of Women in Rural Area; Nutritional Anaemia; Child Development: Status, education, health, Governmental Programmes for children development.

UNIT III: Epidemiology: Definition & aims Epidemiological approach. Basic measurement in Epidemiology, Types of Epidemiological studies.

UNIT IV: Infectious disease, Investigation of an epidemic of Leptospirosis, Malaria, Dengue in Rural set Up & in post disaster situations, Health advice to travelers, Screening for diseases

UNIT V: Prevention of accidents, investigation of public health problems as relevant to basic sciences for a health officer, First aid.

DRT-653-Innovative Commercial production technologies**Credits: 3**

- Unit-I** Commercial production technologies-nature, concept, applications and recent technical advancement.
- Unit-II Mushroom Cultivation:** Morphology and life-cycle, Importance of mushroom as a health food, a cash crop and eco- friendly commodity, Wild and cultivated mushroom, Edible and poisonous types, Tropical and temperate species, Mushroom spawns, media and substrate for different species.
- Unit-III Biofertilizers:** Bacterial, algal and fungal, Production technology and post-harvest handling of fresh and processed products and their marketing.
- Unit-IV Vermicomposting:** Principles and functions of Vermicomposting, Biological mechanism of Vermicomposting, large- scale and small- scale production of vermicomposts.
- Unit-V Biopesticides and Biosupplements;** herbal soaps, fumigants and hygienic products

DRT 654-IT in Rural Development**Credits: 3**

- UNIT-I** Elementary knowledge about computer hardware and software, operating system, MS-Office.
- UNIT-II** Data analysis and appropriate software, Different graph type, operating SPSS
- UNIT-III** Numerical methods of Data Presentation: Mean, Median, Mode, Standard deviation, Correlation, Regression, Chi Square Test.
- UNIT-IV** Audio-Visual Aids: Materials and Equipment-Planning Preparation and use of different types of audio-visual aids-Projectors Films-Tape recorder Television.
- UNIT-V** Introduction of GIS and its components-spatial data organization and management, Remote sensing and its application in rural development.