

Description of courses touching cross cutting issues

Department of Agril. Meteorology

Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya

To,

The Dean

College of Agriculture

A.N.D.U.A.&T., Kumarganj, Ayodhya

Sir,

I am herewith submitting the list of UG/PG/Ph.D. courses offered in the department of Agricultural Meteorology during current semester (2017-18 to 2021-22)

U.G.		
S.No.	Course No.	Title
1.	FAEM-111	Meteorology, Climatology & Geography
2.	AGM-211	Environmental studies & disaster management
3.	AGM-221	Introductory Agrometeorology & Climate change
4.	AGM-311(H)	Introductory Agrometeorology & Climate change
5.	AGM-321	System Simulation & Agro-advisories
P.G.		
1.	AGM-511	Fundamentals of Meteorology
2.	AGM-512	Agrometeorological Instrumentation
3.	AGM-514	Micrometeorology
4.	AGM-515	Evapotranspiration
5.	AGM-516	Applied Agro-meteorology
6.	AGM-521	Fundamentals of Agricultural Meteorology
7.	AGM-525	Weather Forecasting & Weather based Agro-advisory
8.	AGM-527	Fundamentals of Climatology
9.	AGM-591	Master's Seminar
10.	AGM-600	Master's Research
Ph.D.		
1.	AGM-611	General Meteorology
2.	AGM-612	Agricultural Meteorology
3.	AGM-616	Operational Agro-meteorology
4.	AGM-622	Environmental Management
5.	AGM-623	Crop Weather Modeling
6.	AGM-626	Weather Modification
7.	AGM-591	Ph.D. Seminar
8.	AGM-600	Ph.D. Research

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Course No. FAEM-111 Title: Meteorology, Climatology & Geography Credit: 2(1+1)

Course Outline

1. Nature of atmosphere. weather and climate, composition of atmosphere, structure of atmosphere
2. Heat energy of atmosphere: Process of heat transmission, heating of atmosphere, irregular heating of atmosphere
3. Temperature: temperature instruments, periodic, horizontal and vertical temperature variations.
4. Humidity and water vapour relationship between temperature and humidity, distribution of water vapour in atmosphere, evaporation, humidity instruments and measurements.
5. Condensation and precipitation: process of condensation, forms of condensation, precipitation, forms of precipitation, measurement of precipitation.
6. Clouds and thenderstorms: amount of cloudiness, classification of clouds, condition of cloud formation, identification of clouds, thunderstorms. Atmospheric pressure: meaning of atmospheric pressure, pressure units, pressure instruments, vertical, horizontal and periodic variation, isobars and pressure gradients.
7. Wind: characteristics of wind motion, wind observation and measurement, factors affecting wind motion. Terrestrial or planetary winds: ideal planetary wind system, monsoon Terrestrial winds, land and sea breeze.
8. Tropical cyclones: storm division, vertical structure of storm centre, hurricane.
9. Weather forecasting: forecasting process, forecasting from local indications, role of satellite in weather forecasting, effect of climate change on fisheries sector.
10. Introduction to Geography: shape, size and structure of the earth, concepts of latitude, longitude and great circles, model globe, maps and different types of projections.

Practicals

1. To set up the standard Agro-Met. Observatory and Layout.
2. Calculation of time for data recording and precautions in observation.
3. Measurement of actual vapour pressure & relative humidity by Dry & Wet bulb thermometer.
4. Measurement of bright sunshine hours and calculation of solar radiation.
5. Measurement of rainfall and its characteristics.
6. Measurement of Air Temperature (Maximum & Minimum).
7. Measurement of Soil Temperature.
8. Measurement of Atmospheric Pressure.


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9. Measurement of wind direction with wind vane.
10. Measurement of wind speed with anemometer.
11. To Measure the rate of evaporation with the help of USWB open pan evaporimeter

Course No. AGM-211 Title: Environmental Studies and Disaster Management 3(2+1)

Course Outline

1. Multidisciplinary nature of environmental studies; definition, scope and importance Natural resources: Renewable and non-renewable resources and their associated problems.
2. Forest resources: Use and over-exploitation, deforestation, timber extraction and their effects on forest and tribal people. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Food resources. World food problems, changes caused by agriculture, and overgrazing, effects of modern agriculture Energy resources Growing energy needs, renewable and non-renewable energy sources, Land resources Land as a resource, land degradation, soil erosion and desertification. Role of an individual in conservation of natural resources
3. Ecosystems: Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem. Food chains, Introduction, types, characteristic features, structure and function of forest, grassland, and value of biodiversity-consumptive use, productive use, social, ethical, aesthetic values India as a mega-diversity nation. Threats to biodiversity Habitat loss, poaching of wildlife, man-wildlife conflicts, endangered and endemic species of India. In-situ conservation of bio-adversity Environmental
4. Pollution: Definition, cause, effects and control measures of air, water, 5. marine & noise. Solid waste management: causes, effects and control measures of urban 4. and industrial wastes. Role of an individual in prevention of pollution Social Issues and the Environment Unsustainable to Sustainable development, urban problems related to energy, Water conservation, rain water harvesting, and watershed management.
5. Environmental ethics: Issues and possible solutions, climate change, global warming. Environment Protection Act. Air (Prevention and Control of Pollution) Act , Water (Prevention and control of Pollution) Act Wildlife protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness Human Population and the Environment. Population growth, population explosion. Role of information technology in environment and human health.
6. Natural Disasters: Meaning and nature, types (floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, heat and cold waves, Climatic change global warming, ozone depletion) and effects. Man Made Disasters: Nuclear disasters, chemical disasters, forest fire, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents.


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7. Disasters Management International strategy for disaster reduction at national and global levels. National disaster management framework; financial arrangements; role of NGOs, community based organizations and media, central, state, district and local administrations, armed forces in disaster response, police and other organization. Feeding the people struck by the disaster, managing house and dress need during disaster.

Course No AGM-221 (V) Title: Introductory Agrometeorology & Climate Change Credit: 2(1+1)

Course Outline

1. composition extent and structure, Atmospheric weather variables: Atmospheric pressure, its variation with height
2. Wind: Types of wind daily & seasonal variation of wind speed, cyclone, anticyclone, land breeze & sea.
3. Nature & properties of solar radiation, solar constant. depletion of solar radiation, short wave, longwave albedo & net radiation
4. Atmospheric temperature: Temperature Inversion, lapse rate, daily & seasonal variation of temperature, vertical profile of temperature, energy balance of earth.
5. Atmospheric humidity: Concept of saturation, vapour pressure, process of condensation, formation of dew, fog, mist, frost & cloud
6. Precipitation: Process of precipitation, types of precipitation such as rain, snow, sleet and hail, cloud formation & classification. Artificial rain making
7. Monsoon: Mechanism and importance in Indian Agriculture,
8. Weather Hazards: Drought floods, frost, tropical cyclones and extreme weather conditions such as heat wave & cold wave;
9. Agriculture & weather relations: Modifications of crop micro-climate, climatic normals for crop & livestock production
10. Weather Forecasting: Types of weather forecast and their uses. Climate changes climatic variability, global warming causes of climate change and its impact on regional & national Agriculture.

Practicals

1. To set up the standard Agro-Met. Observatory and Layout.
2. Calculation of time for data recording and precautions in observation.
3. Measurement of actual vapour pressure & relative humidity by Dry & Wet bulb thermometer.
4. Measurement of bright sunshine hours and calculation of solar radiation.
5. Measurement of rainfall and its characteristics.
6. Measurement of Air Temperature (Maximum & Minimum).


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7. Measurement of Soil Temperature.
8. Measurement of Atmospheric Pressure.
9. Measurement of wind direction with wind vane.
10. Measurement of wind speed with anemometer.
11. To Measure the rate of evaporation with the help of USWB open pan evoporimeter.
12. Measurement of Humidity with the help of Hygrometer

AGM 311 (H)

Agro-Meteorology and Climate Change

Credit 2(1+1)

Course Outline

1. Agricultural Meteorology Introduction, definition of Meteorology, scope and practical utility of Agricultural Meteorology.
2. Composition and structure of atmosphere and definition of weather and climate.
3. Atmospheric temperature, soil temperature, Solar radiation
4. Atmospheric pressure, atmospheric humidity, evaporation and transpiration, monsoons, rainfall, clouds, drought.
5. Weather disasters and their management, atmospheric pollution and role of Meteorology
6. Basics of weather forecasting, climate change - causes
7. Global warming-causes and remote sensing Effect of climate change on Horticulture, Past and Future changes in greenhouse gases within the atmosphere
8. Sources and sinks for greenhouse gases Plants sense and respond to changes in CO₂ concentration. Measurement of short-term effects and mechanisms underlying the observed responses in C 3 and C 4 species. Physiology of rising CO₂ on nitrogen use and soil fertility, its implication for production
9. Increased temperature and plants in tropical/sub-tropical climates- effect growing season, timing of flowering, duration of fruit development and on of crops to impact on crop yields. Mitigation strategies and prospect for genetic manipulation maximize production in the future atmosphere.

Practicals

1. To set up the standard Agro-Met. Observatory and Layout.
2. Calculation of time for data recording and precautions in observation.
3. Measurement of actual vapour pressure & relative humidity by Dry & Wet bulb thermometer.
4. Measurement of bright sunshine hours and calculation of solar radiation.
5. Measurement of rainfall and its characteristics.


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6. Measurement of Air Temperature (Maximum & Minimum).
7. Measurement of Soil Temperature.
8. Measurement of Atmospheric Pressure.
9. Measurement of wind direction with wind vane
10. Measurement of wind speed with anemometer.
11. To Measure the rate of evaporation with the help of USWB open pan evaporimeter.
Measurement of Humidity with the help of Hygrometer

AGM: 321

System Simulation and Agro-Advisory

Credit: 3(2+1)

Course Outline

1. System Approach for representing soil-plant-atmospheric continuum, system boundaries.
2. Crop models, concepts & techniques, types of crop models, data requirements, relational diagrams.
3. Evaluation of crop responses to weather elements, Elementary crop growth models, calibration, validation, verification and sensitivity analysis.
4. Potential and achievable crop production-concept and modeling techniques for their estimation.
5. Crop production in moisture and nutrients limited conditions; components of soil water and nutrients balance,
6. Weather forecasting, types, methods tools & techniques, forecast verification; Value added weather forecast.
7. ITK for weather forecast and its validity; Crop-Weather calendar Preparation of agro-advisory bulletin based on weather forecast
8. Use of crop simulation model for preparation of Agro-advisory and its effective dissemination

Practical Course Outline

1. Preparation of crop weather calendars.
2. Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts.
3. Working with statistical and simulation models for crop growth.
4. Potential and achievable production; yield forecasting, insect & disease forecasting models.
5. Simulation with limitations of water and nutrient management options.
6. Sensitivity analysis of varying weather and crop management practices.



7. Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast
8. Feedback from farmers about the agro-advisory.

AGM 511

Fundamentals of Meteorology

Credit: 3 (2+1)

Weather elements, compositions & vertical structures of atmosphere, variation of temperature & pressure with height. Lapse rate, pressure gradient. Cyclonic & Anticyclone motions, Geotropic and gradient winds, Polar & trade winds, Flow of winds in upper and lower atmosphere Solar radiation, law of radiation and radiation balance Various humidity parameters & their relationship, vapour pressure, Psychometric equation. Process of condensation, clouds & their classification Evaporation, rainfall & its types, Artificial rain making precipitation, Dew, Frost, Fog, Mist, Thunder storm and hail Effect of earth rotation on zonal distribution of radiation & season Hydrological cycle, El-nino. Layout & types of Agromet observatory, different class & layout.

Practical Course Outline

1. Layout selection installation Agromet.
2. Measurement calculation solar radiation.
3. Analysis of rainfall characteristics.
4. Measurement of average depth rainfall over an area.
5. Computation various types atmospheric humidity.
6. Measurement growing degree-days/ thermal unit.
7. Measurement Absorb photosynthetic radiation.
8. Preparation temperature- Height diagram atmosphere calculation lapse

AGM 512

Agrometeorological Instrumentation

Credit: 3 (1+2)

Course Outline

Principle & operation of meteorological equipments in Agromet Observatory, Range, Resolution & sensitivity on instruments. Working principle & operation of evaporimeter, Anemometer, Wind vane, Soil thermometer, Soil heat flux plates, Barometers. Thermometers/Thermograph, Hair hygograph/Hygograph, Dewgauge, Sunshine recorder, Raingauge/ Self recording raingauge & instruments for measuring the soil moisture. Handling and measuring techniques of infrared soil moisture balance. Luxmeters, pyrormeter, pyranometer. Leaf area meter, spectro- radiometer Infrared thermometer & relative humidity meter. Automatic weather station

Practical Course Outline

Measurement Principle operation; Evaporimeter, Automatic raingauge, Thermograph, Handling measuring techniques of Infrared moisture , Handling techniques of Thermometer. Measurement


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radiation Pyrradiometer/ Pyranometer Demonstration Automatic weather station. Operational techniques & measurement of Fortin/ Barometer. Demonstration of VSAT principle operation.

AGM 514

Micrometeorology

Credit: 3(2+1)

Course Outline

Introduction to micrometeorology, molecular and eddy transport of heat, water vapour & momentum, frictional effect Temperature instability & stability conditions, soil heat flux & sensible heat transfer in the atmosphere. Micro-climate near the bare ground, unstable and inversion layers Roughness length and zero plane displacement & boundary layer adiabatic process & lapse rate. Richardson number and Bowen ratio. Micro-climate within forest, glasshouse & plastic house climates. Variations in microclimate under irrigated and rainfed conditions. Modification of microclimate in different crop growing environment and cultural practices Radiation distribution and utilization by plant communities, leaf temperature and its effects, shelter belts & wind breaks and their modification to microclimate & their effect on photosynthesis/ respiration & water use efficiency. Laws of radiation, light interception & extinction coefficient by plant canopy as affected by crop geometry & its arrangement spectral process of vegetation Albedo, absorbed photosynthetic radiation & radion use efficiency in different microclimatic conditions Instruments & measuring techniques in micrometeorology. Distribution of temperature, RH, wind & vapour pressure in micro climates

Practical Course Outline

1. Study of optical characteristic & light interception by crop.
2. Measurement of light extinction coefficient (K) in the crop canopy in different plant geometry,
3. Measurement of soil heat flux using soil heat flux plate/ soil thermometers.
4. Measurement of incident solar radiation using solarimeter tube/ Lux meter.
5. Measurement of leaf temperature using telethermometer
6. Calculation of Heat Use Efficiency (HUE) & Radiation Use Efficiency (RUE)
7. Measurement of canopy temperature with infrared thermometer.
8. Measurement of wind profile within and outside the crop.
9. Comparison & measurement of water temp., canopy temp. & relative humidity within the crop & outside the crop.
10. Measurement of Adiabatic lapse rate & Bowen ratio.

AGM 515

Evapotranspiration

Credit: 3(2+1)

Course Outline

Basic laws of radiation, environment radiation in atmosphere, crop canopy with plant. Energy balance process. Introductory principals/ of evaporation & evapotranspiration. Laminar and turbulent flow,


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wind profile near the ground. Various theories to the estimation of evapo-transpiration Aerodynamic energy balance, Eddy correlation, Bowen ratio, water balance and other methods and its use in irrigation scheduling. Concept of potential, reference and actual evapotranspiration, techniques of Lysimetry in measuring the actual evapotranspiration. Water use efficiency, crop coefficient and their use. Production functions, Influence of micro-climate on plant, soil cultural factors Comparison of kc values and their use, radiation equipments.

Practical Course Outline

1. Computation of evapotranspiration using Thornthwait & Penman method.
2. Computation of evapotranspiration using Blaney-Criddle & Aerodynamic method.
3. Determination of evapotranspiration using Lysimeter.
4. Computation of evapotranspiration using energy balance & eddy correlation technique,
5. Measurement of soil moisture using Infrared soil moisture balance/ Neutron scattering techniques.
6. Determination of consumptive/ water use efficiency.
7. Calculation of reference evapotranspiration & crop coefficient using various method

AGM 516

Applied Agrometeorology

Credit: 3(3+0)

Course Outline

Phenology and seasonal changes of weather conditions. Thermoperiodism photoperiodism, heat unit concept and its applications. Climate water budgeting technique and its application in evaluation of moisture availability periods within crop growing season. Planning of multiple cropping pattern for different soil, climatic zones of India based on above techniques Influences of agrometeorological factors on incidence of pests and diseases, effects on timing and effectiveness of control, measure on herbicides, nematode population, seed rate. Weather forecasting for Agriculture. General forecasting-Medium range, short range and seasonal forecasting for agricultural purpose Special weather forecasts for frosts, hail insects, pests and diseases, droughts, high wind, heat waves etc. Crop protection from weather hazards Protection from frost, forest fire, drought, floods, wind breaks and shelter belts Direct & Indirect effect of weather on Animals- viz. effect of weather on body weight, growth rate, milk production & feed intake etc.

AGM 521

Fundamentals of Agricultural Meteorology

Credit: 3(2+1)

- 1) Introduction of Agricultural Meteorology in relation to crop/ crop production. Agro-Meteorological parameters measurement and importance.
- 2) Temperature(s) and its impact on crop/ Agriculture; i) Cardinal Temperature ii) Soil Temperature iii) Air Temp. & Sensible heat flux iv) High/low temperature v) Vant Hoff's law.



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- 3) Thermoperiodism & photoperiodism Impact on Agriculture (including Day-Night temp. effect). Growing degree days- Concept, importance and Limitations Climatic normals, characteristics and incidence of pest & disease in crop/ plants- Wheat, Rice, Maize & Chickpea
- 4) Climate change and crop production; i) causes of climate change.
- 5) ii) Impact of climate change Beneficial/ adverse effects of climate change
- 6) Weather forecasting for Agriculture: Types of weather forecasting & its application.
- 7) Meteorological basis of diseases & insect-pest forecast
- 8) Weather hazards effect & remedy
- 9) Crop growth & crop yield model 1) Concept of modeling: Type of models statistical modeling) ii) Characteristics, steps & inputs of modeling (dynamical & Application/ importance of models

Practical Course Outline

1. To study the crop-weather relationship using ergo-graph
2. Measurement of leaf area using leaf area meter
3. To study the occurrence or non-occurrence of diseases epidemics using humid thermal ratio.
4. To develop the statistical crop yield/ crop weather regression model
5. Computation of growing degree days of crops at different phenophases
6. Analysis and classification of drought and management
7. To study the light interception by the crop.
8. To study the impact of weather elements on crop production.

AGM 525
3(2+1)

Weather Forecasting & weather based Agro-advisory

Credit:

Course Outline

Introduction Agriculture and principle of weather forecasting & its uses; Types of weather forecasting and their application in Agriculture; Short range weather forecasting, Medium range weather forecasting, Long range weather forecasting of weather forecasting: Methods; Numerical method, Statistical method, Satellite & cloud imageries Synoptic charts method, DMO method

Crop yield forecasting methods; Maize Rice & Wheat yield forecast model, Forest fire forecast model, Local weather forecasting skills, Monsoon & Western depression , Meteorological basis of disease and insect & pest forecasting ; Long range forecasting, Bacterial wilt & leaf blight, Corn flea beetle Medium range weather forecasting, Wheat rust, Rice stem borer, Potato blight. Accuracy analysis of weather forecast; Error structure eg RK Score, HK Score, Threat scare & RMSE.


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Contingency table for category structure of error (for rainfall & max min temp only). Preparation and mode of dissemination of agro-advisories on the basis of weather forecast
6. Economic impact assessment of agro-advisory-rating & feed back from farmers for its adoption
f. Merits and demerits of the weather based agro-advisory and its importance in present agricultural scenario
Application of weather forecasts in different area(s)
1) Air & defenses, Forest & Telecommunication, Social & others

Practical Course Outline

1. Calculation of success probability and accuracy of weather forecast.
2. Calculation of Ratio score & H.K. score and its interpretation.
3. Calculation of the critical success index (Threat score) and usability analysis of weather forecast.
4. To calculate RMS (Root Mean Square) and correlation coefficient for skill of forecast
5. To prepare the contingency table of weather forecast (rainfall/ temperature).
6. Preparation of weather based agro-advisory
7. Economic impact assessment of weather based Agro-advisory
8. Feed back collection from farmers about weather forecast and advisory
9. Demonstration & Handling of VSAT

AGM 527

Fundamentals of Climatology

Credit: 3(3+0)

Course Outline

- 1) Meaning & scope of Climatology Elements of climate and climatic classification.
- 2) Factors of climate and its Impact
- 3) Classification of climate: Koppen, Thornthwaite, Hydric methods, Hargreaves systems, Cocheme & Frankuin method, Troll's methods
- 4) Climate types characteristics & their distribution: Tropical Wet/Dry & Tropical monsoon climate, Equatorial climate, Temperature climate Tropical Hot desert climate. Continental climate. Monsoonal & Maritime climate.
- 5) Climatic Agro-climatic zones of India. Agro-ecological zones of India Indices for Agroclimatic regionalization.
- 6) Agro-climatic index; Thermal Index Moisture index, Aridity index, Humidity Index etc.
- 7) Climatic change and its causes. Climatic variability and its Impact on Agriculture.
- 8) Monsoon; North-East monsoon, South-West monsoon.
- 9) Global warming.


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Courses for Ph.D.: AI Core Courses

AGM-611 AGRICULTURAL METEOROLOGY GENERAL METEOROLOGY Credit (3+0)

Sun Earth and season. various humidity parameters and their inter-relationships: psychrometry-theory of dry and wet bulb temperature. Radiation of the atmosphere. physical and physiological processes important to radiation. Laws of radiation and green house effect. Climate change and causes. Heat balance of the atmosphere Terrestrial radiation absorption by ozone or Radiation balance. Heat transfer processes Temperature cone of the atmosphere, Distribution of temperature in time and space, sub-divisions of the atmosphere-troposphere, stratosphere, thermosphere etc. Actual and Adiabatic process relation between temperature and pressure in dry air-hydrostatic equation Stability and instability criteria for the atmosphere. Beer's Law Lambert's and cosine In Dynamics of the atmosphere and general circulation of wind system Influence of land masses and oceans on the circulation pattern,-ELNino/LaNino and Southern Oscillation Index. Cyclones and anticyclones, Elementry aspects of weather Forecasting Techniques for short range, medium range and long range forecasting Mechanism of Indian monsoon and general distribution of precipitation during South West and North-East monsoon. Spatial inter-relationships between synoptic features and precipitation distribution during non mon.

AGM-612 AGRICULTURAL METEOROLOGY Credit 3 (2+1)

Important Meteorological observations and process to agriculture Soil-climatic and moisture balance. Thermal regime requirement and impact on different phenophases of crop, growth and development. Pests and diseases, consumptive use, water use efficiency, crop coefficients and crop growing periods. Agro- meteorological statistics and models, climate of trees, orchards and forest, agro- meteorological forecast systems and glass house climate. Radiative transfer in plant communities; momentum, mass and heat exchange in plant communities, radiation and energy balance in plants; micro meteorological models: evapotranspiration and carbon dioxide exchanges in relation to plant growth weather and crop yield relationships. Climate in relation to pest and disease incidence and multiplication: effect of climate on heat exchange of farm animals, climate change and its impact on agriculture; satellite based weather predictions, Remote sensing techniques and their applications to agro meteorology

Practical: Case studies of climate change and agriculture. Development and calibration of crop weather relationships & models, pest-disease and yield data.

AGM-626 WEATHER MODIFICATION Credit 2(2+0)

Review of weather modification, Present status of weather modification in agriculture. theory of weather modification. Cold & warm cloud seeding, mitigation of wind effects, frost mitigation mulching to mitigate weather hazards, weather modification through glass & polythene house, safe growing periods- Modification of frost intensity, wind break, shelter belts and mulches. Modification of severe storms and electrical behavior of clouds. Vegetation and environment for weather modification. Micro-climatic changes and their effects on crops, scientific advances in cloud seeding for rainfall, hail and dissipation of fog. Air pollution and public issues involved in weather modification, Green house effect.

A-2 Optional Courses


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AGM-616

OPERATIONAL AGRO- METEOROLOGY

Credit 3(3+0)

Pest & diseases dynamics in relation to rice & wheat crop Environment & Animals Temperature/environment & milk yield. Temperature, consumption habits & eggs production in Birds Effect of light & rainfall on growth & development of pigeon pen Water temperature & its effect on rice production Effect of heat & cold wave on crop injury Types of drought & its impacts on Agriculture. preparation of contingency planning & crop weather calendar Wind break & shelter belt. Importance of Thermoperiodism & photoperiodism in cereals and pulse crops. Climate change & its impact on Agriculture. Climate water budgeting technique and its application. General forecasting- medium range, short range & seasonal forecasting for agricultural purposes. Special weather forecasts for frosts, hail, insects, pest & diseases

AGM-622

ENVIRONMENTAL MANAGEMENT

Credit 3(2+1)

Basic issues in environmental sciences, Global carbon, nitrogen and phosphorus evils Renewable alternate energy sources, direct solar energy system, active and passive solar energy systems, and wind power system, green house effect change in green house gasses and potential effects of global warming and adjustments to global warming, acid rain and its effects Polar stratospheric clouds introduction to GIS. GPS and remote sensing techniques and their application to monitor environment. Management of environmental factors for sustainable agriculture Human interactions with natural systems, global carbon dioxide balance and air pollution. Meteorological factors affecting dispersion of air pollutants, effects of air pollutants on vegetation, global warming, climatic variability and climatic changes, ozone depletion. Remote sensing in weather forecasting temperature and precipitation estimates, UNEP policies Management of environmental factors for sustainable agriculture

Practicals - Measurement of different types of environmental pollution

AGM-623

CROP WEATHER MODELING

Credit 3(1+2)

Introduction to computer for data base management. Introduction to models, Introduction to software related to different Simulation models. Advantage & limitation of modeling empirical statistical models, crop growth analysis models, crop growth analation models. CERES Rice wheat & maize models Infocrop model, WIGROWS model. Pest & disease prediction model- statistical & dynamical model. Agromet spectral yield models Models validation and sensitive analysis. Linkage of crop model for different applications.

Practicals:-Analysis of different crop models, crop simulation techniques etc



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PGS 505
(e-Course)

**AGRICULTURAL RESEARCH, RESEARCH ETHICS
AND RURAL DEVELOPMENT PROGRAMMES**

1+0

Objective

To enlighten the students about the organization and functioning of agricultural research systems at national and international levels, research ethics, and rural development programmes and policies of Government.

Theory

UNIT I

History of agriculture in brief; Global agricultural research system: need, scope, opportunities; Role in promoting food security, reducing poverty and protecting the environment; National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions; Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centres (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels; International fellowships for scientific mobility.

UNIT II

Research ethics: research integrity, research safety in laboratories, welfare of animals used in research, computer ethics, standards and problems in research ethics.

UNIT III

Concept and connotations of rural development, rural development policies and strategies. Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group – Area Specific Programme, Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/Non-Governmental Organisations. Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.

Suggested Readings

- Bhalla GS & Singh G. 2001. *Indian Agriculture - Four Decades of Development*. Sage Publ.
- Punia MS. *Manual on International Research and Research Ethics*. CCS, Haryana Agricultural University, Hisar.
- Rao BSV. 2007. *Rural Development Strategies and Role of Institutions - Issues, Innovations and Initiatives*. Mittal Publ.
- Singh K.. 1998. *Rural Development - Principles, Policies and Management*. Sage Publ.

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DISASTER MANAGEMENT

1+0

Objectives

To introduce learners to the key concepts and practices of natural disaster management; to equip them to conduct thorough assessment of hazards, and risks vulnerability; and capacity building.

Theory

UNIT I

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, Drought, Cyclone, Earthquakes, Landslides, Avalanches,

etc.. Microbial flora of milk and milk products. Milk plant and dairy equipment hygiene. Quality control of milk and milk products. Milk hygiene practices in India and other countries.

Elements of meat inspection and meat hygiene practices. Pathological conditions associated with the transport of food animals. Hygiene in abattoirs and meat plants. Detection of conditions or diseases and judgements during ante mortem and post mortem inspection. Examination of lymph nodes. Meat as a source of disease transmission. Sources of contamination of meat and methods of carcass decontamination. Speciation of meat. Animal welfare and public health issues. Classification of low risk and high risk material generated in an abattoir and its hygienic disposal. Inspection of poultry for human consumption. Occupational health hazards in abattoir and meat plants.

Foodborne infections and intoxications associated with foods of animal origin. Toxic residues (pesticides, antibiotics, metals and hormones) in foods and associated health hazards. Types of biohazards. Hazard analysis and critical control points (HACCP) system. Importance of ISO 9000 and 14000 series in meat industry. Risk analysis, assessment and management. International food safety standards: World Organisation for Animal Health (OIE), World Trade Organization (WTO) agreements and Codex Alimentarius Commission. Sanitary and phytosanitary measures in relation to foods of animal origin. Food Safety and Standards Act and Regulations. Role of Food Safety and Standards Authority of India (FSSAI), Bureau of Indian Standards (BIS) and other national agencies.

UNIT-2 (VETERINARY EPIDEMIOLOGY)

Definitions, components and aims of epidemiology. Factors influencing occurrence of livestock diseases and animal production. Determinants of disease. Transmission and maintenance of infections. Ecology of disease. Measures and patterns of disease occurrence. Survey and surveillance of animal diseases and related parameters. Epidemiological methods- Descriptive, analytical, experimental, theoretical, serological and molecular. Animal disease forecasting. Strategies of disease management: prevention, control and biosecurity. Economics of animal diseases. National and international regulations on livestock diseases. Role of OIE and laws on international trade of animals and animal products.

UNIT-3 (ZONOTIC DISEASES)

Definition, history and socio-economic impact of zoonotic diseases. Classification of zoonoses and approaches to their management. Multisectoral approach for zoonoses prevention and control. Emerging, re-emerging and occupational zoonoses. Role of domestic, wild, pet and laboratory animals and birds in transmission of zoonoses. Zoonotic pathogens as agents of bioterrorism. Epidemiology, clinical manifestations and management of the following zoonoses: Rabies, Japanese encephalitis, influenza, Kyasanur forest disease, Crimean Congo haemorrhagic fever, Nipah encephalitis, Ebola virus infection, anthrax, brucellosis, tuberculosis, leptospirosis, listeriosis, plague, glanders, Q fever, rickettsiosis, chlamydiosis, taeniasis, cysticercosis, hydatidosis, larva migrans, diphyllorhynchiasis, trichinellosis, toxoplasmosis, fasciolosis, paragonimiasis, sarcocystosis, cryptosporidiosis, amoebiasis, giardiasis, leishmaniasis, superficial and systemic mycosis and prion diseases. Foodborne bacterial zoonoses: salmonellosis, *E. coli* infection, staphylococcal gastroenteritis, clostridial food poisoning, campylobacteriosis etc.

UNIT-4 (ENVIRONMENTAL HYGIENE)

Scope and importance. Ecosystem: Components structure and functions. Biodiversity: uses, threats and conservation. Natural resources: types, uses and abuses. Environmental contaminants in food chain-bioaccumulation, biomagnification and persistent organic pollutants. Environmental pollution: Sources, nature of pollutants, effects on animal and human health. Rural and urban pollution. Air pollution, sources and hazard. Air pollution in animal houses, effect on health and productivity. Airborne diseases - Classification, health hazard, prevention and control. Water-Sources, contamination & their prevention. Water qualities- Physical, chemical, bacteriological and radiological. Water purification methods for community water supplies. Waterborne diseases - Classification, health hazard, prevention and control. Soil, marine and thermal pollution- Classification, sources, hazard, prevention and control. Noise pollution - Sources, hazards, prevention and control. Nuclear hazards or radiological hazard-Types, hazards and radiation protection. National rules and legislations related to environmental pollution and role of pollution control board in India. Biosafety: Importance, classification and biosafety measures for prevention of risk hazards. Disaster management and mitigation. Solid and liquid waste management at farms and biomedical waste management. Sanitation and disinfection of farm and hospital environment in veterinary public practice for infection control. Global warming and greenhouse effect- Definition, greenhouse gases, impact of climate change and international treaties or protocols. Management of waste from animal industries. Stray and fallen animal management and carcass disposal. Vector and reservoir control.

PRACTICAL

UNIT-1 (VETERINARY PUBLIC HEALTH AND FOOD SAFETY)

Collection of samples for chemical and bacteriological examination. Grading of milk by dye reduction test, direct microscopic examination and standard plate count. Quality assurance tests for processed milk and milk products. Tests for plant sanitation-Air, water and equipment. Microbiological examination of raw milk, pasteurized milk, milk products, meat, meat products and eggs-standard plate count, coliform count, enterococcal count, psychophilic and psychotrophic

organisms, thermophilic bacteria and yeast and mold count. Detection of organisms of public health significance from food products by techniques. Tests for detection of mastitic milk. Ante-mortem and post-mortem inspection of food animals. Demonstration or detection of toxic chemicals and contaminants of public significance from milk and meat. Detection of antimicrobial residues in milk and meat by microbiological and analytical techniques. Demonstration of speciation of meat.

UNIT-2 (VETERINARY EPIDEMIOLOGY)

Sampling methods for epidemiological studies. Measurement of disease frequencies. Sources, storage, retrieval and representation of disease information or data. Demonstration of selected software programmes or models. Evaluation of sensitivity and specificity of diagnostic tests by epidemiological methods. Determination of associations of disease and hypothesized causal factors. Survey of an animal disease on a farm. Epidemiological investigation of disease outbreaks.

UNIT-3 (ZONOTIC DISEASES)

Detection, isolation and identification of important pathogens of zoonotic importance from animal, human and environmental sources including foods of animal origin. Detection of zoonotic diseases by serological, molecular and hypersensitivity tests. Study of probable association of human disease conditions with animal diseases present in an area. Study of rural environment and health status of rural community.

UNIT-4 (ENVIRONMENTAL HYGIENE)

Sampling methods for testing quality of air, water, soil and other environmental sources. Physical, chemical and microbiological examination of water. Estimation of residual chlorine and chlorine demand. Isolation & identification of pathogens from air, water and other environmental sources. Disinfection of animal houses. Determination of efficacy of disinfectants – Phenol coefficient, MIC and MBC. Demonstration or visit to water purification system. Demonstration of various ventilation systems in animal houses and specialized laboratories. Demonstration of toxic residues in water and other environmental sources. Visit to local polluted site and documentation of local environmental problems – like dumping grounds, local slum areas, crowded localities etc.

ANNUAL EXAMINATION

PAPERS	UNITS	MAXIMUM MARKS	WEIGHTAGE
THEORY			
Paper-I	1 and 2	100	20
Paper-II	3 and 4	100	20
PRACTICAL			
Paper-I	1 and 2	60	20
Paper - II	3 and 4	60	20

(x) DEPARTMENT OF VETERINARY PARASITOLOGY

VETERINARY PARASITOLOGY

Credit Hours: 3+2


THEORY

UNIT-1 (GENERAL VETERINARY PARASITOLOGY)

Parasitology: Introduction, Important historical landmarks, importance of parasitology in veterinary curriculum. Types of parasites (ecto, endo, hyper, obligatory, facultative, stenoxenous, euryxenous, monoxenous, heteroxenous, histozoic, coelozoic, temporary, permanent, pseudo, aberrant, incidental, opportunistic, zoonotic, protelean etc.). Types of hosts (definitive, intermediate, reservoir, paratenic, natural, unnatural, etc.) and vectors. Types of animal associations (symbiosis, phoresy, commensalism, parasitism, mutualism and predatorism). Modes of transmission of parasites and methods of dissemination of the infective stages of the parasites. International Code of Zoological Nomenclature: Rules and regulations, Standard Nomenclature of Animal Parasitic Diseases (SNOAPAD). Immunity against parasitic infections or infestations, natural and acquired immunity, premunity, sterile immunity, autoimmunity, passive immunity, concomitant immunity and immune evasion by parasites. General harmful effects of parasites including various tissue reactions caused by parasites. General control measures against parasites. Characters of various phyla of parasites.

UNIT-2 (TREMATODES AND CESTODES OF VETERINARY IMPORTANCE)

Trematodes: Introduction, general account and classification, general life cycle of trematodes with morphological features of their developmental stages. Important morphological features, life cycles, modes of transmission,


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K.D.A.R.T. Kumbhari, Pimpri

(xvi) DEPARTMENT OF VETERINARY MEDICINE**VETERINARY MEDICINE****Credit Hours: 4+1****THEORY****UNIT-1 (GENERAL)**

History and scope of Veterinary Medicine, concept of animal diseases. Concepts of diagnosis, differential diagnosis, treatment and prognosis. General systemic states, hyperthermia, hypothermia, fever, septicemia, toxemia, shock, allergy, anaphylaxis, oedema, coma, anaemia, common clinical poisonings and dehydration.

Estimates of diseases, patterns of disease, disease monitoring and surveillance, herd health and quarantine.

UNIT-2 (SYSTEMIC DISEASES)

Etiology, clinical manifestations, diagnosis, differential diagnosis, treatment, prevention and control of the following diseases of cattle, buffalo, sheep, goat, horse, pig, dog, cat and poultry: Diseases of digestive, respiratory, cardiovascular, urinary, nervous, musculoskeletal, haemopoietic, and lymphatic systems, skin, sense organs

including affections of peritoneum, liver and pancreas. Emergency medicine and critical care.

UNIT-3 (METABOLIC AND DEFICIENCY DISORDERS)

Diagnosis and management of diseases caused by deficiency of iron, copper, cobalt, zinc, manganese, selenium, calcium, phosphorus, magnesium, iodine, vitamin A, D, E, B complex, K and C. Diseases of neonates, Alternative or integrated or ethno veterinary medicine in animal disease management. Actiology, clinical manifestations, diagnosis, differential diagnosis, treatment prevention and control of metabolic or production and endocrine diseases of cattle, buffalo, sheep, goat, horse, pig, dog, cat and poultry i.e. Milk fever, eclampsia, osteodystrophy fibrosa, lactation tetany, downer cow syndrome, ketosis, fat cow syndrome, hypomagnesaemia, Nutritional haemoglobinuria, azoturia, diabetes, hypothyroidism, Cushing syndrome, Addison's disease and Gout.

UNIT-4 (ZOO AND WILD ANIMAL MEDICINE)

Principles of zoo hygiene, public health problems arising from zoos. Prevention, control and treatment of infectious, parasitic, nutritional and metabolic diseases in zoo and wild animals including exotic birds. Acts and Rules related to Zoo and wild animals. National and international organizations and institutions interlinked to wild and zoo animals – role and functioning.

UNIT-5 (BACTERIAL, FUNGAL AND RICKETTSIAL DISEASES)

Aetiology, epidemiology, clinical manifestations, diagnosis, treatment, prevention and control of bacterial, fungal and rickettsial diseases of livestock: mastitis, hemorrhagic septicaemia, brucellosis, tuberculosis, Johne's disease, listeriosis, leptospirosis, campylobacteriosis, actinomycosis, actinobacillosis, bordetellosis, glanders, strangles, ulcerative lymphangitis, colibacillosis, fowl typhoid, pullorum disease, fowl cholera, avian mycoplasmosis, spirochaetosis, salmonellosis, swine erysipelas, contagious caprine pleuropneumonia, contagious bovine pleuropneumonia, anthrax, clostridial infections, ehrlichiosis, chlamydiosis, Q fever, anaplasmosis, dermatophilosis, aspergillosis, candidiasis, histoplasmosis, sporotrichosis, coccidioidomycosis, mycotoxicosis and rhinosporidiosis.

UNIT-6 (VIRAL AND PARASITIC DISEASES)

Aetiology, epidemiology, clinical manifestations, diagnosis, treatment, prevention and control of viral and parasitic diseases of diseases of cattle, buffalo, sheep, goat, horse, pig, dog, cat and poultry: Foot and mouth disease, rinderpest, bovine viral diarrhoea, malignant catarrhal fever, infectious bovine rhinotracheitis, ephemeral fever, blue tongue, sheep pox, goat pox, PPR, classical swine fever, rabies, equine influenza, equine infectious anemia, equine rhinopneumonitis, canine distemper, infectious canine hepatitis, canine parvoviral disease, corona viral infection, adeno virus infection, feline rhinotracheitis, feline pan leucopenia, feline infectious peritonitis, avian influenza, New Castle disease, Marek's disease, avian leucosis, infectious bronchitis, infectious laryngotracheitis, avian encephalomyelitis, chicken reo virus, fowl pox, infectious bursal disease, chicken infectious anemia, inclusion body hepatitis-hydropericardium syndrome, emerging and exotic viral diseases of global importance.

Parasitic diseases: Trematodes, cestodes, nematodes, protozoan infections and external parasites of clinical importance.

UNIT-7 (JURISPRUDENCE, ETHICS, AND ANIMAL WELFARE)

Legal duties of veterinarians, laws related to medicine, evidence, common offences against animals and laws related to these offences. Examination of living and dead animals in criminal cases. Cruelty to animals and bestiality. Legal aspects of: Examination of animals for soundness, examination of injuries and post-mortem examination. Causes of sudden death in animals. Collection and despatch of materials for chemical examination, detection of frauds-doping, alternation of description, bishoping etc. Cattle slaughter and evidence procedure in courts. Provincial and Central Acts relating to

College of Community Science

3. Environmental Studies and Disaster Management

Credit
3(2+1)

Hours:

Theory

Multidisciplinary nature of environmental studies- Definition, scope and importance. Natural resources- Renewable and non-renewable resources and their associated problems. Forest resources- Use and over-exploitation, deforestation, timber extraction, mining, dams and their effects on forest and tribal people. Water resources- Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources- Use and exploitation, environmental effects of extracting and using mineral resources. Food resources- World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. Energy resources- Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Land resources- Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources, equitable use of resources for sustainable lifestyles.

Ecosystems- Concept, structure and function of an ecosystem. Producers, consumers and decomposers, energy flow in the ecosystem, ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of forest, grassland, desert and aquatic ecosystems. Biodiversity and its conservation- Introduction, definition, genetic, species, ecosystem diversity and biogeographical classification of India. Value of biodiversity- Consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels, India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity- Habitat loss, poaching of wildlife, man-wildlife conflicts, endangered and endemic species of India. In-situ and Ex-situ conservation of biodiversity.

Environmental pollution- Definition, cause, effects and control measures of air, water, soil, marine, noise and thermal pollution and nuclear hazards. Solid waste management- Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.

Social issues and the environment- Unsustainable to sustainable development, urban problems related to energy. Water conservation, rain water harvesting, watershed

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Patel

DEAN
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HDFS 503

**GENDER ISSUES IN
HUMAN
DEVELOPMENT AND
FAMILY RELATIONS**

2+1

Objective

To orient the students regarding the gender issues in human development and family relationships to impart experiences regarding gender issues, family practices and biases prevalent in Indian Society.

Theory

UNIT I

Concept of gender- its biological and socio-cultural connotations. Importance of gender differences in human development. Gender theories-gender orientation theory of Sandra Bem, gender schema theory, theory of ego development and gender.

UNIT II

Demographic challenges to family ecology, gender issues in family involvement and cohesiveness (socialization, family roles, responsibilities and family adjustment) impact of gender roles, responsibilities and socialization practices.

UNIT III

Working towards family solidarity and social well being (values and ethics in the promotion of happy family life).

UNIT IV

Changing trends in gender role orientation, its socio- economic and cultural impact on the family and society.

Practical

Gender analysis of mass media content, books, television and films. Interviewing children and parents to study gender socialization practices. Administering gender role orientation scale to adolescents /women interpreting the results. Case study of three generation families to identify the differences in the gender orientation roles and responsibilities. Case studies for gender role performance.



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DEPARTMENT OF VETERINARY PUBLIC HEALTH & EPIDEMIOLOGY

DISASTER MANAGEMENT (PGS 506)

Theory 1(1+0)

Unit I

Natural Disasters, Meaning and Nature, Types and Effects etc, Floods, Drought, Cyclone, Earthquakes, Landslides, Avalanches, Volcanic Eruptions, Heat and Cold Waves, Climatic Change - Global Warming, Sea Level Rise, Ozone Depletion.

Unit II

Man-made Disasters, Nuclear Disasters, Chemical Disasters, Biological Disasters, Building Fire, Coal fire, Forest Fire, Oil fire 56-88 Air Pollution, Water Pollution, Industrial Wastewater Pollution, Deforestation, Road and Rail Accidents, Air and Sea Accidents.

Unit III

Disaster Management, Disaster Management System, National Disaster Management Authority, National Institute of Disaster Management, National Disaster Management Framework, Financial Arrangements, National Disaster Response Force, Challenges in Disaster Management Plan, International Day for Risk Reduction.

ENVIRONMENTAL POLLUTION AND SAFETY (VPH 608)

Theory (3+1)

UNIT I Introduction to environmental hygiene, environment and health, microbial aspects of pollution.

UNIT II Soil pollution, air pollution, water pollution and health.

UNIT III. Genetic risk from environmental agents, health problems from nuclear energy and radiation pollution, environmental estrogens and pesticides pollution.

UNIT IV

Dissemination of excreted pathogens, animal-waste and human risk, principles of safe disposal of waste.

UNIT V

Heavy metals, pesticides, veterinary drug residues and human health. Practical Determination of potability of drinking water, estimation and detection of pathogenic microbes in water, air, soil, animal products, sewage, and animal waste, inspection of sewage and waste disposal plants/sites.

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Head
Deptt of Veterinary Public Health & Epid
College of Vet Science & A.H
M.H.A & T. Kirani Farzahan 2022

BIOTERRORISM AND DISASTER MANAGEMENT (VPH 610)

Theory (1+1)

UNIT I:

Natural and man made disaster, impact analysis and classification of disaster scale, essential preparations to manage disaster, role and sequence of emergency medical services by veterinarians.

UNIT II

Effect of natural disasters like floods, prolonged draughts, forest fires, earthquakes, sunami and tidal damages, storms etc. on animal population both domestic and wild, post-disaster disease susceptibility, emergency control and remedial measures.

UNIT III Biomedical hazards and biosafety, occupational health risk management. Major agents and their characteristics which have been used in the past and those which can be used in future as biological weapons.

UNIT IV Biological weapons, hazard analysis and combating bioterrorism. Bioethics and social ethics, advisory role of veterinarians.

Practical

Detection of biohazards during disaster, detection and characterization of various organisms used as biological agents, use of disinfectants for their destruction

DISPOSAL AND RECYCLING OF WASTE (VPH 705)

Theory (2+1)

UNIT I

Concept of 'reduce, reuse and recycle' in environmental management, role of holistic environmental biotechnology and microbial control of pollution.

UNIT II

Safe disposal of animal waste and food plant waste, utilization/recycling of livestock waste.

UNIT III

Pollutants due to sewage, sewage treatment systems, solid waste and its management. Practical To study the role of microorganisms and chemicals in degrading waste, to study the factors influencing biodegradation.

BIOHAZARDS, BIOSECURITY AND DISASTER MANAGEMENT (VPH 706)

Theory (2+0)

UNIT I

Biohazards and bioterrorism: case studies.

UNIT II

Innovative biosecurity approaches.

UNIT III

Regulations for safety in laboratories, hospitals, biological plants.

UNIT IV

Case studies of natural and man-made disasters. Approaches for management of disasters.

Formation of teams/ groups. Equipments required for managing such disasters.

Head
Head

ADVANCES IN ENVIRONMENTAL POLLUTION CONTROL (VPH 708)

Theory (2+1)

UNIT I

Advanced studies on problems pertaining to environmental hygiene, air, soil and water pollution, disinfection procedures, impact of global environmental problems on human/animal health; Eco philosophy, environmental ethics and environmental economics, environmental conflicts and cooperation.

UNIT II

Environmental risks and management, environmental risk assessment and reporting, modern global information, surveillance and monitoring systems, decision making and public awareness.

UNIT III

International environmental management efforts, participatory international organizations and their selected programmes and selected legislations.

Practical

Detection and estimation of air, soil and water pollution; detection of pathogens in environmental sources.

Human Value and Ethics (EXT-112)

Theory 1(1+0)

Values and Ethics-An Introduction. Goal and Mission of Life. Vision of Life. Principles and Philosophy. Self-Exploration. Self-Awareness. Self-Satisfaction. Decision Making. Motivation. Sensitivity. Success. Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination


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College of Veterinary Science & A.H.
P. T. Kulkarni, Falzahad, 22/11/2020