

5/24/2021

Gmail - New Syllabus of Department of Agricultural Engineering and Soil & water conservation as per NEP 2021



कृषि अभियंत्रण

Purvanchal University <aracademicvbsp@gmail.com>

## **New Syllabus of Department of Agricultural Engineering and Soil & water conservation as per NEP 2021**

1 message

**Jitendra Kumar** <jitendrakumar2007@gmail.com>  
To: aracademicvbsp@gmail.com

Sun, May 23, 2021 at 11:34 AM

Dear sir

Please find attachment of new syllabus of department of Agricultural Engineering and department of soil water conservation as per NEP 2021.

Thanking you

Er. Jitendra Kumar

Assistant Professor (Agril. Engg)

Convenor BoS (Agril. Engg. And SWC)

5/31/2021

Gmail - Syllabus of Agri Engg and SWC. As per NEP 2021



कृषि अभियंता

Purvanchal University <aracademicvbspu@gmail.com>

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## Syllabus of Agri Engg and SWC. As per NEP 2021

1 message

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**Jitendra Kumar** <jitendrakumar2007@gmail.com>  
To: aracademicvbspu@gmail.com

Mon, May 31, 2021 at 3:31 PM

Dear sir

Please find attachment of new syllabus of department of Agricultural Engineering and department of soil water conservation as per NEP 2021.


Thanking you

Er. Jitendra Kumar

Assistant Professor (Agril. Engg)

Convenor BoS (Agril. Engg. And SWC)

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## DEPARTMENT OF AGRICULTURAL ENGINEERING

Course Code	Course Title	Credit Hours
AG-306	Farm Machinery and Power	3(2+1)
AG-406	Renewable Energy and Green Technology	2(1+1)
AG-505	Protected Contribution and Secondary Agriculture	3(2+1)

### AGRICULTURAL ENGINEERING

#### 1. Farm Machinery and Power 2(1+1) AG-306

##### Theory

Status of Farm Power in India, Sources of Farm Power, I.C. engines, working principles of I.C. engines. comparison of two stroke and four stroke cycle engines Study of different components of I.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor, Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations. Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment. Familiarization with harvesting and threshing equipment.

##### Practical

Study of different components of I.C. engine. To study air cleaning and cooling system of engine. Familiarization with clutch, transmission, differential and final drive of a tractor, Familiarization with lubrication and fuel supply system of engine, Familiarization with brake, steering, hydraulic control system of engine, Learning of tractor driving. Familiarization with operation of power tiller, Implements for hill agriculture, Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow.

Familiarization with seed-cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter Familiarization with different types of sprayers and dusters Familiarization with different inter-cultivation equipment. Familiarization with harvesting and threshing machinery.

## **2. Renewable Energy and Green Technology 2(1+1) AG-406**

### **Theory**

Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers. biogas. bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, introduction of wind energy and their application.

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### **Practical**

Familiarization with renewable energy gadgets. To study biogas plants, To study gasifier, To study the production process of biodiesel, To study briquetting machine, To study the production process of bio-fuels. Familiarization with different solar energy gadgets. To study solar photovoltaic system: solar light, solar pumping, solar fencing. To study solar cooker, To study solar drying system. To study solar distillation and solar pond.

## **3. Protected Cultivation and Secondary Agriculture 3(2+1) AG-505**

### **Theory**

Green house technology: Introduction, Types of Green Houses: Plant response to Green house environment, Planning and design of greenhouses. Design criteria of green house for cooling and heating purposes. Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying. Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals. pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration; moisture measurement, EMC, drying theory, various drying method. commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer. recirculatory dryer and solar

dryer). Material handling equipment: conveyer and elevators, their principle, working and selection.

**Practical**

Study of different type of green houses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of green house equipments. Visit to various Post Harvest Laboratories. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

## DEPARTMENT OF SOIL CONSERVATION

Course Code	Course Title	Credit Hours
AG-106	Introduction to Forestry	2(1+1)
AG-308	Environmental Studies and Disaster Management	2(1+1)
AG-310	Fundamental of Soil and Water Conservation	2(1+1)
AG-409	Introductory Agro-meteorology & Climate Change	2(1+1)
AG-607	Watershed and Wasteland Management	2(1+1)

## SOIL CONSERVATION

### 1. Introduction to Forestry (New) 2(1+1) AG-106

#### Theory

Introduction - definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies. Forest regeneration, Natural regeneration - natural regeneration from seed and vegetative parts, coppicing, root suckers; Artificial regeneration - objectives. choice between natural and artificial regeneration. Essential preliminary considerations. Crown classification. Tending operations - weeding, cleaning, thinning - mechanical, ordinary, crown and advance thinning. Forest mensuration - objectives, diameter measurement, instruments used in diameter measurement; measurement of volume of felled and standing trees, age determination of trees. Agroforestry - definitions. importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens. Cultivation practices of two important fast growing tree species of the region.

#### Practical

Identification of tree-species. Diameter measurements using calipers and tape. Volume measurement of logs using various formulae. Nursery lay out, seed sowing, vegetative propagation techniques. Forest plantations and their management. Visits of nearby forest based industries.

## 2. Environmental Studies and Disaster Management 2(1+1) AG-308

### Theory

Multidisciplinary nature of environmental studies Definition, scope and importance. Natural Resources: Renewable and non-renewable resources. Natural resources and associated problems.

a) Forest resources: Use and over-exploitation, deforestation. case studies. Timber extraction, mining. dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water. floods. drought. conflicts over water, dams benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture. Fertilizer pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Case studies.

f) 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 of an ecosystem, 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 the following ecosystem:

a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries), 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. Hotspots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. 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: Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change,

global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, dies, Wasteland reclamation, Consumerism and waste products. 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, variation among nations, population explosion, Family Welfare Programme . Environment and human health: Human Rights, Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.

#### **Disaster Management**

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, ozone depletion. Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters. building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste, water pollution. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of N(it)s, community - based organizations and media. Central, state, district and local administration.

#### **Practical**

Pollution case studies. Case Studies- Field work: Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain, visit to a local polluted site- Urban/Rural/Industrial/Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc.

### **3. Fundamental of Soil and Water Conservation 3(2+1) AG-310**

#### **Theory**

Introduction to Soil and Water Conservation. causes of soil erosion. Definition and agents of soil erosion. water erosion: Forms of water erosion. Gully classification and control measures. Soil loss estimation by universal Loss Soil Equation. Soil loss measurement techniques. Principles of erosion control: Introduction to contouring. strip cropping. Contour bund. Graded bund and bench terracing. Grassed water ways and their design. Water harvesting and its techniques. Wind



erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

**Practical**

General status of soil conservation in India. Calculation of erosion index. Estimation of soil loss. Measurement of soil loss. Preparation of contour maps. Design of grassed water ways. Design of contour bunds. Design of graded hunds. Design of bench terracing system. Problem on wind erosion.

**4. Introductory Agro-meteorology & Climate Change 2(1+1) AG-409**

**Theory**

Meaning and scope of agricultural meteorology; Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze; Nature and properties of solar radiation. solar constant, depletion of solar radiation, short wave. longwave and thermal radiation, net radiation, albedo: Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation. process of precipitation. types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification: Artificial rainmaking. Monsoon-mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations; Modifications of crop microclimate, climatic normals for crop and livestock production. Weather forecasting- types of weather forecast and their uses. Climate change. climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

**Practical**

Visit of Agrometeorological Observatory, site selection of observatory, exposure of instruments and weather data recording. Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law. Measurement of albedo and sunshine duration, computation of Radiation Intensity using ASS. Measurement of maximum and minimum air temperatures. its tabulation, trend and variation analysis. Measurement of soil temperature and computation of soil heat flux. Determination of vapor pressure and relative humidity.

Determination of dew point temperature. Measurement of atmospheric pressure and analysis of atmospheric conditions. Measurement of wind speed and wind direction, preparation of windrose. Measurement, tabulation and analysis of rain. Measurement of open pan evaporation and evapotranspiration. Computation of PET and AET.

#### **5. Watershed and wasteland Management 2(1+1) AG-607**

##### **Theory**

Watershed management - Concept need, principles & components of watershed management integrated watershed management. Factors effecting watershed management runoff& soil loss management in a watershed socio-economic concept of watershed. Peoples participation in watershed management. Policy approaches & management plan, problems of watershed management. Wasteland management - Definition, concept & types of degraded & wasteland. Distribution & extent of watershed in India & Uttar Pradesh. factors responsible for land degradation, characteristics of different types of degradation & wasteland. Problems of degraded land in Uttar Pradesh. Appropriate techniques for management of different types of degraded & wasteland.

##### **Practical**

Characterization and delineation of model watershed. Field demonstration on soil & moisture conservation measures. Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed.