**SEMESTER - II**

**SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Introductory Agro Meteorology and Climate Change**

**Course Code: AGRO103**

**No. of Hours: 30 Hrs. Credits: 2**

**Objectives:**

* To study about climatic resources of a given area for effective crop planning
* To evolve weather based effective farm operations
* To study crop weather relationship
* To understand roles of agro meteorology in agriculture

**Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the earth’s atmosphere and weather variables.

**CO2:**Outline types of precipitation

**CO3:** Summarize artificial rain making, monsoon mechanism and weather hazards.

**CO4:** Relate weather conditions to agriculture.

**CO5:** Discuss weather forecasting and impact of climate change on agriculture.

**UNIT-I: (6Hrs.)**

1. Earth atmosphere, composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height

2. Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze.

**UNIT-II: (6Hrs.)**

1. Atmospheric humidity, concept of saturation, vapour pressure, process of condensation, formation of dew, fog, mist, frost, cloud.

2. Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification.

**UNIT-III: (6Hrs.)**

1. 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;

2. Agriculture and weather relations, modifications of crop microclimate, climatic normal for crop and livestock production.

**UNIT-IV: (6Hrs.)**

1. Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, energy balance of earth;

2. Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, long wave and thermal radiation, net radiation, albedo

**UNIT-V: (6Hrs.)**

1. Weather forecasting, types of weather forecast and their uses.

2. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

**References Text Books:**

1. Radha Krishna Murthy,V.2016. Principles and practices of agricultural disaster management. B.S Publications, Koti, Hyderabad.

2. Reddy, S.R.2014. Introduction to Agriculture and Agrometeorology. Kalyani Publishers, Ludhiana, Punjab.

**MODEL QUESTION PAPER**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Introductory Agro Meteorology and Climate Change**

**Course Code: AGRO103**

**Time: 3 Hrs. Max. Marks: 100**

**SECTION-A**

**Answer ALL questions:201 = 20 M**

1. Layer of ozone is present in
2. Stratosphere
3. Troposphere
4. Ionosphere
5. Mesosphere
6. Number of Agro climatic zones in Andhra pradesh are
   1. 8
   2. 9
   3. 7
   4. 6
7. According to planning commission agroclimatic region of the whole country has been divided into
8. 15
9. 14
10. 13
11. 12
12. Movement of air occur in the atmosphere up to height of
    1. 10km
    2. 15km
    3. 16km
    4. 17km
13. The process by which a cloud droplet first form is
14. Prespitation
15. condensation
16. Conversion
17. Non the the above
18. Tornadoes most often move toward what direction
19. East north
20. North west
21. North south
22. North east
23. High clouds tops generally are limited by the height of the
24. Tropo pause
25. Strato pause
26. Iono pause
27. Meso pause
28. The transfer of heat by molecule to molecule contact is
29. conduction
30. precipitation
31. Horizontal line
32. Convention
33. The first meteorology satellite was launched in the year
34. 1960
35. 1994
36. 1993
37. 1995
38. The cup anemometer rotates
39. West to east
40. North to south
41. North to east
42. North to west
43. In a volume of air near the earth's surface, \_\_\_\_ occupies
44. \_\_\_\_The amount of force exerted over an area of surface is\_\_\_\_\_\_\_\_\_
45. Much of Tibet lies at altitudes over 18,000 feet where the pressure is about 500 mb. At such altitudes, the Tibetans are above roughly\_\_\_\_\_
46. The planet with a strong greenhouse effect, whose surface temperature averages 480°C (900°F) is:\_\_\_\_\_\_\_\_\_\_
47. In the stratosphere, the air temperature normally\_\_\_\_\_\_\_\_
48. The most abundant gas in the stratosphere is\_\_\_\_\_\_\_\_\_\_\_
49. Scientists are able to determine the air temperature in the thermosphere by\_\_\_\_\_\_\_\_
50. The rate at which temperature decreases with increasing altitude is known as the\_\_\_\_\_\_\_\_\_
51. Meteorology is the study of\_\_\_\_\_\_\_\_\_\_

20. Where cold surface air replaces warm air, the boundary separating the different bodies of air is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**SECTION-B**

**Answer any FOUR questions:48 = 32 M**

21. Explain about agro climatic zones of AndhraPradesh ?

22. Define silviculture and objectives of silviculture?

23. Explain Monsoon?mechanism and importance in Indian agriculture.

24. Explain Wind? Types of wind, daily and seasonal variation of wind speed?

25. Define Earth Atmosphere ? Composition, extent and structure of earth atmosphere?

26. Explain Atmospheric humidity? concept of saturation?

**SECTION-C**

**Answer any FOUR questions: 412 = 48 M**

27. Define Weather forecasting, types of weather forecast and their uses?

28. Define Agroforestry – definitions, importance, criteria of selection of trees in agroforestry

29. Explain Nature and properties of solar radiation, solar constant, depletion of solar radiation?

30. Define Precipitation, process of precipitation, types of precipitation and classification?

31. Explain about Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature?

32. Explain agro climatic zones of India?

**PRACTICAL SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Introductory Agrometeorology and Climate Change-Practical**

**Course Code: AGRO103P**

**No. of Hours: 30 Hrs. Credits: 1**

**Objectives:**

* To study about climatic resources of a given area for effective crop planning.
* To evolve weather based effective farm operations.
* To study about crop weather relationship.
* To understand roles of Agro meteorology in agriculture.

**Course Outcomes:**

**CO1:**Students will understand about Earth atmosphere, composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height.

**CO2:**Students will understand about Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, long wave and thermal radiation, net radiation, albedo.

**CO3:**Students will understand about Atmospheric humidity, concept of saturation, vapour pressure, process of condensation, formation of dew, fog, mist, frost, cloud.

**CO4:** Students will learn about Artificial rainmaking; Monsoon, mechanism and importance in Indian agriculture.

**CO5:** Weather forecasting, types of weather forecast and their uses.

**EXPERIMENTS:**

**1.** Visit to Agrometeorological Observatory, site selection and layout plan for observatory. **(3 Hrs.)**

2. Exposure to agrometeorological instruments and weather data recording. **(4 Hrs.)**

3. Measurement of albedo and sunshine duration. **(3 Hrs.)**

4. Computation of radiation Intensity using bright sun shine hours.**(3 Hrs.)**

5. Tabulation of maximum and minimum air temperatures, trend and variation analysis for climate change of the region. **(3 Hrs.)**

6. Measurement of soil temperature and computation of soil heat flux.

**(4 Hrs.)**

7. Determination of atmospheric pressure and vapour pressure. **(3 Hrs.)**

8. Determination of relative humidity. **(3 Hrs.)**

9. Determination of dew point temperature- Measurement of atmospheric

pressure and analysis of atmospheric conditions. **(4 Hrs.)**

**Scheme of Evaluation**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Experiment** | **Marks (50)** |
| 01 | Major Experiment | 15Marks |
| 02 | Minor Experiment | 10Marks |
| 03 | Viva | 10Marks |
| 04 | Record | 10Marks |
| 05 | Skills | 05Marks |

**SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Fundamentals of Genetics Course Code: GPBR 111**

**No. of Hours: 30 Hrs. Credits: 2**

**Objectives:**

* To learn and apply concepts of modern transmission and molecular genetics.
* To study the purpose of the cell cycle
* To study about the mendals laws
* To study about different scientists and their contribution to the genetics.

**Course Outcomes**

At the end of the course, students will be able to

**CO1:** Discuss details of cell cycle and structures of cell organelles.

**CO2:**Explain heredity and laws of inheritance in genetics.

**CO3:** Compare gene interactions, recessive and dominant traits.

**CO4:** Outline the concepts of karyotype, sex linkage and mutations.

**CO5:** Summarize the central dogma of genetic material and genetic code.

**UNIT-I: (6Hrs.)**

1. Pre Mendelian concepts of heredity – Early history of heredity, inheritance of acquired traits, preformation theory, pangenesis and germplasm theory.

2. Chromosome - Structure of chromosome, types of chromosomes based on position of centromere.

3. Cell division – Cell cycle – Mitosis - Process of mitosis - Significance.

4. Meiosis - Process - Differences between mitosis and meiosis - Significance.

5. Mendelian principles of heredity – Terminology, Mendel’s experiments-Reasons for selection of pea as experimental material- characters studied - Reasons for mendel’s success.

6. Mendel’s laws – Law of segregation – Law of independent assortment–Principle of dominance – Principle of unit characters – Exceptions to mendel’s laws – Rediscovery of mendelian principles.

**UNIT-II: (6Hrs.)**

1. Gene interaction - Nonepistatic interaction – Interaction of factors; epistatic interactions – Complementary epistasis, dominant epistasis.

2. Recessive epistasis, duplicate dominant gene action, dominant suppression or inhibitory gene action, duplicate genes with cumulative effect.

2. Multiple alleles – Characteristics of multiple alleles - Blood groups in humans, coat colour in rabbits, self incompatibility alleles in plants - pleiotropism, penetrance and expressivity.

4. Linkage – Definition – Classification of linkage – Characteristic features of linkage – Linkage groups.

5. Detection of linkage – Estimation of linkage - Importance of test cross in linkage studies - significance in plant breeding.

**UNIT-III: (6Hrs.)**

1. Chromosome mapping – point and

2. point test cross – Cytological maps and genetical maps –

3. Coincidence and interference.

4. Sex determination – Various mechanisms of sex determination – Chromosomal sex determination, genic balance mechanism of sex determination in Drosophila melanogaster, male haploidy, single gene effects etc.

5. Sex linkage – White eye colour in Drosophila, colour blindness and haemophilia in humans - sex influenced traits – Horns in sheep, baldness in humans, sex limited - Milk production in cattle, beard in man – Pseudohermaphrodites – Gynandromorphs.

6. Qualitative and Quantitative traits, Polygenes and continuous variations - Definition - Inheritance and their differences, multiple factor hypothesis.

**UNIT-IV: (6Hrs.)**

1.Nature and structure of genetic material - DNA and its structure -Watson and Crick’s model - Function – Experiments to prove DNA as genetic material.

2. Replication of DNA - Modes of DNA replication - Semi-conservative DNA replication - Experimental proof.

3. Types of RNA - Messenger RNA, ribosomal RNA and transfer RNA - structure of tRNA, dfferences between DNA and RNA.

4. Tanscription and translational mechanism of genetic material - Genetic code – Properties of genetic code – Wobble hypothesis.

**UNIT-V: (6Hrs.)**

1.Mutation - Classification - Gene mutations - Introduction - Definition - Types of mutations - Spontaneous and induced mutations - Point mutations - Characters of mutations - Xenia and metaxenia – Chimeras Types and their significance in plant breeding.

2. Methods of inducing mutations, Physical and chemical mutagens - Detection of sex linked lethals in Drosophila (ClB method given by Muller).

3. Molecular basis of mutations - Transitions, transversions and frame shift mutations - Importance of mutations in plant breeding.

**References Text Books:**

1. Pundhan Singh. 2006. Genetics. Kalyani Publishers, Ludhiana.

2. Singh, B.D. 2015. Fundamentals of Genetics. Kalyani Publishers, Ludhiana.

3. Gupta, P.K.2007. Genetics. Rastogi Publications, Meerut. 4. Khanna, V.K. 2002. Genetics Numerical Problems. Kalyani publishers. 2nd edition.

**MODEL QUESTION PAPER**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Fundamentals of Genetics Course Code: GPBR 111 Time: 3 Hrs. Max. Marks: 100**

**SECTION-A**

**Answer ALL questions: 201 = 20 M**

1. \_\_\_\_\_\_\_\_\_ Introduced the term CELL

1. L. da Vinci
2. R. Hooke
3. C. F Wolff
4. R. Brown

2. Genetics was coined by Bateson in \_\_\_\_\_\_\_\_ Year

1. 1906
2. 1905
3. 1904
4. 1903

3. In plants, a cell is always surrounded by \_\_\_\_\_\_\_\_

1. Nuclear envelop
2. Cell wall
3. Middle lamella
4. Cytoplasm

4. Chloroplast contains\_\_\_\_\_\_\_\_\_\_

1. Chlorophyll A
2. Chlorophyll B
3. DNA & RNA
4. All the above

5. Chromosomes discovered in the year\_\_\_\_\_

1. 1875
2. 1876
3. 1877
4. 1878

6. Metacentric centromere assume \_\_\_\_\_\_\_ in shape

1. V
2. J or L
3. J
4. I

7. \_\_\_\_\_\_\_\_\_\_\_Proposed double helix structure

1. Friedrich Meischer
2. Watson and Crick
3. E. Strasburger
4. A.P.W Schimper

8. Chloroplast are bound by \_\_\_\_\_ unit membrane

1. Two
2. Three
3. Four
4. Five

9. The optimum temperature for renaturation is \_\_\_\_\_\_\_

1. 15-17 C
2. 20-25 C
3. 22-26 C
4. 20–26 C

10. Proposed the first Operational microscope in the year \_\_\_\_\_\_

1. 1600
2. 1678
3. 1590
4. 1595

11. The tendency of an offspring to resemble its parent is known as\_\_\_\_\_\_.

12. Who is known as the “Father of Genetics”\_\_\_\_\_\_\_\_\_.

13. The alternate form of a gene is\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

14. The genotypic ratio of a monohybrid cross is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

15. The crossing of F1 to either of the parents is known as\_\_\_\_\_\_\_\_\_\_\_.

16. “Law of segregation” is law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

17. Homozygosity and heterozygosity of an individual can be determined by\_\_\_\_\_\_\_\_\_\_\_\_.

18. An exception to Mendel’s law is\_\_\_\_\_\_\_\_\_\_\_.

19. Pea plants were used in Mendel’s experiments because\_\_\_\_\_\_\_\_\_\_\_\_.

20. The smallest unit of genetic material which produces a phenotypic effect on mutation is\_\_\_\_\_\_\_\_\_\_\_\_.

**SECTION-B**

**Answer any FOUR questions**:**48 = 32 M**

21. Explain Mendelian principles of heredity?

22. Explain Protein synthesis and Central dogma ?

23. Explain Methods of inducing mutations ?

24. Explain the Differences between Plant cell and Animal cell?

25. Explain about special types of Chromosomes?

26. Explain about Plant Cell wall?

**SECTION-C**

**Answer any FOUR questions:412 = 48 M**

27. Explain Types of RNA?

28. Explain Meiosis - Process - Differences between mitosis and meiosis?

29. Explain Mutation – Classification ?

30. Explain Qualitative and Quantitative traits?

31. Explain about Deoxy ribose Nucleic Acid (DNA) ?

32.Explain difference between Prokaryotic cell and Eukaryotic cell?

**PRACTICAL SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Fundamentals of Genetics-Practical**

**Course Code: GPBR 111P**

**No. of Hours: 30 Hrs. Credits:1**

**Objectives:**

* To learn and apply concepts of modern transmission and molecular genetics.
* To study the purpose of the cell cycle.
* To study about the mendals laws.
* To study about different scientists and their contribution to the genetics.

**Course Outcomes:**

**CO1:**Students will understandabout Pre Mendelian concepts of heredity.

**CO2:** Students will understandChromosome - Structure of chromosome, types of chromosomes.

**CO3:** Students will learn about Linkage.

**CO4:**Students will learn about Sex determination in plants.

**CO5:**Students will learn about Cell division, Cell cycle, Mitosis.

**EXPERIMENTS:**

1. Study of microscope. **(3Hrs.)**

2. Study of cell structure. **(3Hrs.)**

3. Practice on meiotic cell division. **(4Hrs.)**

4. Monohybrid and its modifications, Dihybrid and Trihybrid. **(4Hrs.)**

5. Test cross and back cross. **(4Hrs.)**

6. Epistatic interactions including test cross and back cross. **(4Hrs.)**

7. Study of models on DNA and RNA structure. **(4Hrs.)**

8. Epistatic interactions including test cross and back cross. **(4Hrs.)**

**Scheme OF EVALUATION**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Experiment** | **Marks (50)** |
| 01 | Major Experiment | 15Marks |
| 02 | Minor Experiment | 10Marks |
| 03 | Viva | 10Marks |
| 04 | Record | 10Marks |
| 05 | Skills | 05Marks |

**MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA–8**

**(Affiliated to Krishna University, Machilipatnam)**

**SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Fundamentals of Entomology- I Course Code: ENTO131**

**No. of Hours: 30 Hrs. Credits: 2**

**Objectives:**

* To study of insects and their relationship to humans and environment
* To study about types of reproduction
* To study about insect taxonomy
* To study about Body segmentation. Structure of Head, thorax and abdomen.

**Course Outcomes**

At the end of the course, students will be able to

**CO1:**Classify insecta and account for their abundance and dominance

**CO2:** Explainthe morphology and anatomy of insects.

**CO3:** Discuss the life cycle and endocrine systems of insects

**CO4:**Summarize the taxonomical features in various orders of insecta.

**UNIT-I: (6Hrs.)**

1. History of Entomology in India. Factors for insect’s abundance. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropodaupto classes.

2. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and moulting.

**UNIT-II: (6Hrs.)**

1. Body segmentation. Structure of Head, thorax and abdomen.

2. Structure and modifications of insect antennae, mouth parts, legs, wing venation, modifications and wing coupling apparatus.

3. Structure of male and female genital organs. Metamorphosis and diapause in insects.

**UNIT-III: (6Hrs.)**

1. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretory (Endocrine) and reproductive systems in insects.

2. Types of reproduction in insects. Major sensory organs like simple and compound eyes and chemoreceptors.

**UNIT-IV: (6Hrs.)**

1. Systematics: Taxonomy–importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order.

2. Classification of class Insectaupto orders. basic groups of present day insects with special emphasis to orders and families of agricultural importance like Arthoptera: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae;

**UNIT-V: (6Hrs.)**

1.Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Miridae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera:

2.Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Lymantridae, Saturniidae, Bombycidae;

3. Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Apionidae, Bruchidae, Scarabaeidae;

**References Text Books:**

1. Chapman, R. F 2013 Insects: Structure and Function. Ed by Simpson, S. J. and Douglas, A. C. Cambridge Univ. Press, UK.

2. Richards, O.W. and Davies, R.G 1977. Imm’s General Text Book of Entomology (Vol. I and II). Chapman and Hall, London.

3. Wigglesworth, V.B 2013. Insect Physiology. Springer (Originally published by Chapman and Hall, London, 1974).

4. Pant, N.C. and Ghai, S. 198. Insect Physiology and Anatomy. ICAR, New Delhi.

**MODEL QUESTION PAPER**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Fundamentals of Entomology- I Course Code: ENTO131 Time: 3 Hrs. Max. Marks: 100**

**SECTION-A**

**Answer ALL questions: 201= 20 M**

1.Rageeni strain is related to

1. Bee
2. Silkworm
3. Lac insect
4. None of these

2. Number of nymphal stage is Acarina is

1. 3
2. 4
3. 5
4. 6

3. Excreta of the earth worm is

1. Vermicompost
2. Verni manure
3. Vermicastin
4. None of these

4. The process of leaving off the colony by the queen is known as

1. Absconding
2. Swarming
3. Supersdure
4. Queen excluder

5. The process of killing pupa without changing the cocoon shell is known as

* 1. Stiffling
  2. denier
  3. dupion
  4. odonata

6. Which of the following statements is true about Entomology?

* + 1. The study of Birds
    2. The study of Insects
    3. The study of Microbes
    4. The study of Parasitic worms

7. Which of the following are the main characteristic features of an Insect?

* + 1. Pair of antennae
    2. Three pairs of legs
    3. Pair of wings
    4. All of the above

8. Which of the following is called the resting and inactive stage in the insect life cycle?

* + 1. The Egg stage
    2. The Larva stage
    3. The pupa stage
    4. The Adult stage

9. Which of the following is not a natural predator of BPH?

* + 1. Bugs
    2. Red ants
    3. Spiders
    4. All of the above

10. Insects, which feed on one type of food, are called \_\_\_\_\_\_\_.

* + 1. Polyphagous
    2. Monophagous
    3. Entomophagy
    4. None of the above

11. Which bacteria is responsible for staining of the cotton fiber\_\_\_\_\_\_\_\_

12. Scientific name of banana aphid is\_\_\_\_\_\_

13. The pest which attack both in field and storage of pulses is\_\_\_\_\_\_\_\_\_-

14. In paddy, the elongation of leaf sheath, when infested by gall fly (Orseollaoryzae) is due to a chemical known as\_\_\_\_\_\_\_\_\_

15. The bushy appearance with dead heart in sugarcane at 6th inter-node is due to\_\_\_\_\_\_\_\_

16. The last segment in the abdomen of male cockroach in addition of cerci will have a pair of\_\_\_\_\_\_\_\_\_

17. Example of an exopterygote insect order with a pupal instar in its life cycle\_\_\_\_\_-

18. Example of an insect order in which nymphs are called naids\_\_\_\_\_\_\_\_\_

19. Supra oesophagial ganglion is also called\_\_\_\_\_\_\_\_\_

20. The holes at the base of sorghum peduncle are due to\_\_\_\_\_\_\_\_\_\_

**SECTION-B**

**Answer any FOUR questions**:**48 = 32 M**

21. Explain about Major sensory organs?

22. Explain Body segmentation of an insect?

23. Explain about Structure and modifications of insect antennae?

24. Explain Types of insect larvae and pupae of an insect?

25. Explain Dictyoptera: Mantidae, Blattidae; Odonata;?

26. Explain Structure and functions of insect cuticle and moulting?

**SECTION-C**

**Answer any FOUR questions**:**412 = 48 M**

27. Explain Types of reproduction in insects?

28. Explain History of Entomology in India?

29. Explain Classification of class Insect aupto orders?

30. Explain about Study of characters of orders Orthoptera?

31. Explain about Systematics:Taxonomy–importance, history and development of an insect ?

32. Explain Relationship of class Insecta with other classes of Arthropoda. Morphology?

**PRACTICAL SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Fundamentals of Entomology- I Practical**

**Course Code: ENTO131P**

**No. of Hours: 30 Hrs. Credits:1**

**Objectives:**

* To study about insects and their relationship to humans and environment
* To study about types of reproduction
* To study about insect taxonomy
* To learn about Body segmentation. Structure of Head, thorax and abdomen.

**Course Outcomes:**

**CO1:** Students will learn about History of Entomology in India

**CO2**: Students will understand about Structure and modifications of insect antennae, mouth parts, legs, wing venation, modifications and wing coupling apparatus.

**CO3:** Students will learn about Types of reproduction in insects

**CO4:** Students will learn about Insect Taxonomy

**CO5:** Students will learn about Classification of class Insect up-to orders.

**EXPERIMENTS:**

1. Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle. **(7 Hrs.)**

2. Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. **(8 Hrs.)**

3. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper). **(8 Hrs.)**

4.Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. **(7 Hrs.)**

**Scheme of Evaluation**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Experiment** | **Marks (50)** |
| 01 | Major Experiment | 15Marks |
| 02 | Minor Experiment | 10Marks |
| 03 | Viva | 10Marks |
| 04 | Record | 10Marks |
| 05 | Skills | 05Marks |

**SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Soil and Water Conservation Engineering**

**Course Code: AENG151**

**No. of Hours: 30 Hrs. Credits: 2**

**Objectives:**

* To study about natural resources management for sustainable agriculture.
* To study about management of land and water.
* To study about irrigation projects.

**Course Outcomes**

At the end of the course, students will be able to

**CO1**: Discuss types of soil erosion, and control measures.

**CO2:** Explain the concept of irrigation water measurements.

**CO3:** Outline different water harvesting techniques.

**UNIT-I: (6Hrs.)**

1.Introduction to soil and water conservation and causes of soil erosion.

2. Definition and agents of soil erosion, water erosion - Forms of water erosion - Gully classification and control measures.

3. Soil loss estimation by universal soil loss equation - Soil loss measurement techniques.

**UNIT-II: (6Hrs.)**

1.Principles of erosion control - Introduction to contouring, strip cropping.

2. Contour bund - Graded bund and bench terracing.

3. Wind erosion - Mechanics of wind erosion, types of soil movement - Principles of wind erosion control and its control measures.

4. Grassed water ways and their design.

**UNIT-III: (6Hrs.)**

1. Introduction to irrigation - Classification of irrigation projects.

2. Importance of irrigation water measurements - Volumetric, area velocity, discharge methods - Weirs, orifice, flumes.

3. Open channel hydraulics - Discharge calculations.

**UNIT-IV: (6Hrs.)**

1.Types of wells - Water lifting devices - Classification of pumps, their capacity, power requirement and discharge calculations.

2. Functional components and working principle of underground pipeline systems.

**UNIT-V: (6Hrs.)**

1.Functional components of micro irrigation systems and its design like drip, sprinkler irrigation systems etc.

2. Water harvesting techniques - Lining of ponds, tanks and canal systems.

**References Text Books**

1.Ghanshyam Das., 2012. Hydrology and Soil Conservation Engineering,

including Watershed Management. Second edition, PHI Learning Private Limited, New Delhi - 110001

2.Murthy, V. V.N., 2004. Land and Water Management Engineering. Kalayani Publishers, New Delhi

3.Michael A.M., 2007. Irrigation Theory and Practice. Second edition. Vikas Publishing House Pvt. Ltd.

**MODEL QUESTION PAPER**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Soil and Water Conservation Engineering**

**Course Code: AENG151**

**Time: 3 Hrs. Max. Marks: 100**

**SECTION-A**

**Answer ALL questions: 201= 20 M**

1. A man can develop:

A. 0.1 hp

B. 0.5 hp

C. 0.75 hp

D. 1.0 hp

2. The average force that a bullock can exert:

1. 1/5th of their body weight
2. 1/10th of their body weight
3. 1/20th of their body weight
4. 1/25th of their body weight

3. Medium size bullock can develop:

1. 0.50 to 0.75 hp
2. 0.75 to 1.0 hp
3. 0.75 hp to 1.1 hp
4. 1.0 to 1.5 hp

4. The thermal efficiency of diesel engine varies between:

1. 25 and 32 per cent
2. 32 and 38 per cent
3. 32 and 40 per cent
4. 40 and 45 per cent

5. The thermal efficiency of petrol engine varies between:

1. 25 and 32 per cent
2. 30 and 35 per cent
3. 32 and 38 per cent
4. 30 to 40 percent

6. The extra high speed engines used in knapsack sprayers are powered by:

1. Kerosene
2. Diesel
3. Petrol
4. Dual fuel

7. Broad base terrace is also known as:

1. Bench terrace
2. Channel terrace
3. Drainage type terrace
4. None of these

8. The velocity required to operate wind mill is more than:

1. 5 km ph
2. 10 km ph
3. 5 miles per hour
4. 10 miles per hour

9. Bench terracing is also called as:

1. Hill farming
2. Staircase farming
3. Erosion control farming
4. None of these

10. The power produced from a wind speed 6.4 to 37 km ph by windmill varies from:

1. 0.1 to 0.5 hp
2. 0.1 to 0.9 hp
3. 0.5 to 1 hp
4. 1 to 9 hp

II.Fillin the blanks:

11. Land leveling is not essential for irrigation with \_\_\_\_\_\_\_\_ method

12 The relative proportion of salt, silt and clay determine the soil

13. The \_\_\_\_\_\_\_ is a vertical section through soil mass

14. Archimedean screw is suitable to lift water from open water bodies to height ranging from \_\_\_\_\_\_

15. Water logging may occur due to following factor

16. The soil is more permeable, chances of water logging are \_\_\_\_\_\_\_\_\_

17. The soil moisture at field capacity varies from soil to soil but it range generally varies from \_\_\_\_\_\_\_

18. The moisture content at which the wilting is complete and the plant die is called \_\_\_\_\_\_\_\_

19. \_\_\_\_\_\_\_\_ actual area irrigated in a year from an outlet

20. In water saving to the tune of \_\_\_\_\_\_\_ % is possible in drip irrigation system

**SECTION-B**

**Answer any FOUR questions:48 = 32 M**

21. Explain Wind erosion, Mechanics of wind erosion, types of soil movement?

22. Explain Types of wells?

23. Explain about Importance of irrigation water measurements?

24. Explain agents of soil erosion, water erosion

25. Explain about Open channel hydraulics

26. Explain about Water harvesting techniques

**SECTION-C**

**Answer any FOUR questions:412 = 48 M**

27. Explain soil and water conservation and causes of soil erosion?

28. Explain irrigation - Classification of irrigation projects?

29. Explain Water lifting devices and classification of pumps, their capacity, power requirement and discharge?

30.Explain Principles of wind erosion control and its control measures.

31. Explain Forms of water erosion and Gully classification and control measures.

32. Explain Grassed water ways and their design.

**PRACTICAL SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Soil and Water Conservation Engineering-Practical**

**Course Code: AENG151P**

**No. of Hours: 30Hrs. Credits: 1**

**Objectives:**

* To study about natural resources management for sustainable agriculture
* To study about management of land and water
* To study about irrigation projects

**Course Outcome:**

**CO1**: Students will understand to soil and water conservation and causes of soil erosion.

**CO2:** Students will understand Wind erosion - Mechanics of wind erosion, types of soil movement.

**CO3:**Students will understand Open channel hydraulics.

**CO4:**Students will understand **S**oil loss estimation by universal soil loss equation.

**CO5:** Students will understand Functional components of micro irrigation systems.

**EXPERIMENTS:**

1.Practicing survey - Principles and educating to use pacing technique for measurement. **(4 hrs.)**

2.Area calculations through chain survey - GPS demo for tracking and area measurement. **(4 hrs.)**

3. Estimation of soil loss and calculation of erosion index. **(3 hrs.)**

4. Levelling concepts and practical utility in agriculture. **(4 hrs.)**

5.Water discharge measurements lab exercises for computing discharge. 12&13. Different irrigation pumps and their constructional differences. **(4 hrs.)**

6. Farm Pond construction and its design aspects. **(3 hrs.)**

7. Farm Pond and canal lining and its procedures. **(4 hrs.)**

8.Visit to nearby farm pond. **(4 hrs.)**

**Scheme of Evaluation**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Experiment** | **Marks (50)** |
| 01 | Major Experiment | 15Marks |
| 02 | Minor Experiment | 10Marks |
| 03 | Viva | 10Marks |
| 04 | Record | 10Marks |
| 05 | Skills | 05Marks |

**SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Fundamentals of Plant Pathology-I Course Code: PATH171**

**No. of Hours: 30 Hrs. Credits: 2**

**Objectives:**

* To prevent and control disease of economic importance
* To preventing the introduction and spread of pests.
* To study different groups: fungi, bacteria, fastidious vesicular bacteria.
* To Study about Nematodes and General morphology and reproduction.

**Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the scope and concepts of plant pathology.

**CO2:** Compare morphological and anatomical characters of fungi

**CO3:** Outline the rules of nomenclature and classification of fungi.

**CO4:** Identify viruses and classify plant parasites.

**CO5:** Explain different plant nematodes and characters.

**UNIT-I: (6Hrs.)**

1. Importance of plant diseases, scope and objectives of Plant Pathology.

2. Important plant pathogenic organisms,

3.Different groups: fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them.

**UNIT-II: (6Hrs.)**

1. Diseases and symptoms due to abiotic causes. Fungi: General characters, definition of fungus, somatic structures,

2. Types of fungal thalli, fungal tissues, Modifications of Thallus, reproduction (asexual and sexual).

**UNIT-III: (6Hrs.)**

1. Nomenclature, Binomial system of nomenclature, rules of nomenclature.

2. Classification of fungi. Key to divisions, sub-divisions, orders and classes. Bacteria and mollicutes: general morphological characters.

**UNIT-IV: (6Hr.)**

1. Basic methods of classification and reproduction. Viruses: nature, architecture, multiplication and transmission. Study of phanerogamic plant parasites.

**UNIT-V: (6Hrs.)**

1. Nematodes: General morphology and reproduction

2. Classification, symptoms and nature of damage caused by plant nematodes (Heterodera, Meloidogyne, Anguina etc.)

**References Text Books:**

1. Alexopoulos, C.J., Mims C.W. and Blackwell M. 1996. Introductory Mycology.

2. Wiley Eastern Ltd., New York. Mandahar, C.L. 1987.

3. Introduction to Plant Viruses. S. Chand and Co., New Delhi.

4. Mehrotra, R.S. and Aneja, K.R. 1990. An Introduction to Mycology.

**MODEL QUESTION PAPER**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Fundamentals of Plant Pathology-I Course Code: PATH171 Time: 3 Hrs. Max. Marks: 100 M**

**SECTION-A**

**Answer ALL questions:201= 20 M**

1. Deficiency of which of these leads to interveinal chlorosis

a) Magnesium

B) Calcium

C) Nitrogen

D) Coblt

2. Little leaf disease is due to deficiency of

a) Nitrogen

B) Manganese

C) Sodium

D) Zinc

3. Mycotoxin Produced By Aspergillus Flavus

A) Phytoalexin

B) Dystrophin

C) Amphylotoxin

D) Aflatoxin

4. Boll Rot Of Cotton Is Caused By

A) Agaricus

B) Penillin

C) Puccinia

D) Rhizopus

5. Pucciniagraministritici occurring on the wheat crop is also names as

A) orange rust

B) black rust

C) green rust

1. Yellow rust

6. Downy mildew disease is caused by

1. albugo
2. Puccinia
3. All above
4. None of the above

7. Which disease of plant is known as rig disease

1. Citrus canker
2. Black arm
3. Wilt of potato
4. None of the above

8. Bunchy top of banana plant disease is caused due to

1. Bacteria
2. fungus
3. virus
4. none

9. Which one of the following cannot be dected by ELISA technique?

1. viroid
2. fungus
3. bacteria
4. virus

10. Suicidal germination takes place in

1. Bacteria
2. actinomycetes
3. fungi
4. earthworm

11. Exclusion of plant disease by legislation is known as\_\_\_\_\_\_\_

12. First of all microscope discovered by\_\_\_\_\_\_\_\_\_

13. First plant parasitic bacteria was reported by\_\_\_\_\_\_\_\_\_

14. First plant parasitic nematode discovered was\_\_\_\_\_\_\_\_\_\_

15. First plant parasitic nematode was reported by\_\_\_\_\_\_\_\_\_

16.Flag smut of sweat could be controlled by\_\_\_\_\_\_\_\_\_\_\_

17.Flag smut of wheat is caused by\_\_\_\_\_\_\_\_\_\_\_

18.Foot rot of papaya is caused by\_\_\_\_\_\_\_\_\_\_\_\_\_

19.Fungi, which can grow on living host plant, are called\_\_\_\_\_\_\_\_\_\_

20. Fungi which can grow only on living host plant are called\_\_\_\_\_\_\_\_\_\_

**SECTION-B**

**Answer any FOUR questions: 48 = 32 M**

21. Explain Contributions of any four Scientists?

22.Explain methods of sexual reproduction?

23. Define mycology? Explain important Phytopathogenic organisms?

24. Explain Nematodes: General morphology and reproduction

25. Explain classification, symptoms and nature of damage caused by plant nematodes?

26. Explain Diseases and symptoms due to abiotic causes. Fungi?

**SECTION-C**

**Answer any FOUR questions: 412 = 48 M**

27. Explain Basic methods of classification and reproduction?

28. Explain Nomenclature, Binomial system of nomenclature, rules of nomenclature.

29. Explain Importance of plant diseases, scope and objectives of Plant Pathology.

30. Define Plant Pathology? Explain about importance of plant pathogens?

31. Explain types of Reproduction in Fungi?

32. Explain General characteristics and types of Fungi?

**PRACTICAL SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Fundamentals of Plant Pathology-I Practical**

**Course Code: PATH171P**

**No. of Hours: 30 Hrs. Credits: 1**

**Objectives:**

* To prevent and control disease of economic importance.
* To preventing the introduction and spread of pests.
* To study about different groups: fungi, bacteria, fastidious vesicular bacteria.
* To study about Nematodes and General morphology and reproduction.

**Course Outcomes:**

**CO1:**Students will understand Importance of plant diseases, scope and objectives of Plant Pathology.

**CO2:**Students will learn about Diseases and symptoms due to abiotic causes. Fungi: General characters, definition of fungus, somatic structures.

**CO3:** Students will understand Nomenclature, Binomial system of nomenclature, rules of nomenclature.

**CO4:**Students will understand Basic methods of classification and reproduction.

**CO5:** Students will understand Nematodes: General morphology and reproduction.

**EXPERIMENTS:**

1. Study of vegetative structures of fungi and their modifications.**(3 Hrs.)**

2. Study of reproductive (sexual and asexual) structures of fungi.**(4 Hrs.)**

3. Study of Pythium and Phytophthora. **(4 Hrs.)**

4. Study of Albugo. **(3 Hrs.)**

5. Study of imperfect fungi – Aspergillus, Penicillium and Pyricularia.

**(4 Hrs.)**

6. Study of imperfect fungi – Fusarium, Rhizoctonia and Sclerotium.

**(4 Hrs.)**

7. Isolation of phytopathogenic bacteria (locally available diseased plant material) and study of colony characteristics and Gram’s staining.

**(4 Hrs.)**

8. Demonstration of mechanical transmission of plant viruses. **(4 Hrs.)**

**Scheme OF EVALUATION**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Experiment** | **Marks (50)** |
| 01 | Major Experiment | 15Marks |
| 02 | Minor Experiment | 10Marks |
| 03 | Viva | 10Marks |
| 04 | Record | 10Marks |
| 05 | Skills | 05Marks |

**SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Zero Budget Natural Farming Course Code: SDCZN**

**No. of Hours: 30 Hrs. Credits:** **2**

**Objectives:**

* To improve the livelihoods of Farmers.
* To understand about livelihoods from agriculture and allied sectors.
* To reducing or zero use of chemical fertilizers.
* To know the Usage of cow dung and cow urine and plant extracts for improving the soil texture.

**Course Outcomes**

At the end of the course, students will be able to

**CO1:**Explain the methods of preparation of zero budget natural farming, nutritive value and advantages and disadvantages.

**CO2:** Identify the materials used to make natural fertilizers.

**CO3:** Demonstrate procedure for the preparation of natural fertilizers.

**CO2:** Students will learn abouton farm farmer trainings.

**CO3:** Students will understand aboutOrganic certification.

**CO4:**Students will understand aboutZBNF input shops.

**PRACTICAL**

**UNIT-I: (6 Hours)**

1. Introduction to ZBNF - History, definition

2. Brief description methods of preparation of ZBNF

**UNIT-II: (6 Hours)**

1. Procedure for preparation of Natural Fertilizers by step by step

2. Materials used for Natural Fertilizers

**UNIT-III: (6 Hours)**

1.Key elements and strategy of ZBNF

**UNIT-IV: (6 Hours)**

1. Nutrient values for used in ZBNF

**UNIT-V: (6 Hours)**

1. Advantages and Disadvantages in ZBNF

**Reference Text Books:**

* 1. 1975 (in English) 1978 re-presentation The One-Straw Revolution: An Introduction to Natural Farming.
  2. [**^**](https://en.wikipedia.org/wiki/Natural_farming#cite_ref-2) ["Life and Death in the Field | Final Straw – Food | Earth | Happiness"](http://www.finalstraw.org/life-and-death/). www.finalstraw.org. Retrieved 2017-04-16.
  3. [**^**](https://en.wikipedia.org/wiki/Natural_farming#cite_ref-3) Floyd, J.; Zubevich, K. (2010). "Linking foresight and sustainability: An integral approach". Futures. **42**: 59–68. [doi](https://en.wikipedia.org/wiki/Doi_(identifier)):[10.1016/j.futures.2009.08.001](https://doi.org/10.1016%2Fj.futures.2009.08.001).
  4. [**^**](https://en.wikipedia.org/wiki/Natural_farming#cite_ref-4) Hanley, Paul (1990). ["Agriculture: A Fundamental Principle"](https://web.archive.org/web/20130327202848/http:/www.bahai-studies.ca/journal/files/jbs/3.1%20Hanley.pdf) (PDF). Journal of Bahá'í Studies. **3** (1). Archived from [the original](https://www.bahai-studies.ca/journal/files/jbs/3.1%20Hanley.pdf) (PDF) on March 27, 2013. Retrieved April 28,2014.
  5. [**^**](https://en.wikipedia.org/wiki/Natural_farming#cite_ref-Duncan1996_5-0) Colin Adrien MacKinley Duncan (1996). [The Centrality of Agriculture: Between Humankind and the Rest of Nature](https://books.google.com/books?id=c0ZcTTXw9a8C). McGill-Queen's Press - MQUP. [ISBN](https://en.wikipedia.org/wiki/ISBN_(identifier)) [978-0-7735-6571-5](https://en.wikipedia.org/wiki/Special:BookSources/978-0-7735-6571-5).
  6. [**^**](https://en.wikipedia.org/wiki/Natural_farming#cite_ref-6) Trees on Organic Farms, Mirret, Erin Paige. North Carolina State University, 2001
  7. [**^**](https://en.wikipedia.org/wiki/Natural_farming#cite_ref-stock_and_morse_7-0) Stephen Morse; Michael Stockin (1995). [People and Environment: Development for the Future](https://books.google.com/books?id=nPeHlOh0y_UC). Taylor & Francis Group. [ISBN](https://en.wikipedia.org/wiki/ISBN_(identifier)) [978-1-85728-283-2](https://en.wikipedia.org/wiki/Special:BookSources/978-1-85728-283-2).
  8. Elpel, Thomas J. (November 1, 2002). Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills. [ISBN](https://en.wikipedia.org/wiki/ISBN_(identifier)) [1892784122](https://en.wikipedia.org/wiki/Special:BookSources/1892784122).
  9. [What Does Natural Farming Mean?](http://www.jef.or.jp/backnumber/162th_promenade.pdf) [Archived](https://web.archive.org/web/20110720070520/http:/www.jef.or.jp/backnumber/162th_promenade.pdf) 2011-07-20 at the [WaybackMachine](https://en.wikipedia.org/wiki/Wayback_Machine" \o "Wayback Machine)by Toyoda, Natsuko

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**SYLLABUS**

**Subject: Agriculture and Rural Development Semester: II**

**Course Title: Seed Bed Preparation Course Code: CERSBP**

**No. of Hours: 30Hrs. Credits: I**

**Objectives:**

* To prepare the Field.
* To learn about preparation of seed bed.
* To understand about Seed bed treatment.
* To understand about different methods of sowing.

**Course Outcomes:**

**CO1**: Students will understand about seed bed.

**CO2:** Students learn about Preparation of beds.

**CO3**: Students will learn about Design criteria and constructional details of seed bed.

**CO4:** Students will understand uses of seed bed.

**PRACTICAL**

**UNIT-I: (6 Hours)**

1. Introduction to seed bed - History, definition

2. Brief description methods of preparation of field

**UNIT-II: (6 Hours)**

1. Procedure for preparation of seed bed by step by step

2. Materials used for seed bed of greenhouses

**UNIT-III: (6 Hours)**

1. Different types of seed bed

**UNIT-IV: (6 Hours)**

1. Seed bed treatment

**UNIT-V: (6 Hours)**

1. Advantages and Disadvantages in seed bed

**Reference Text Books:**

1.Holzworth, L.K., Wiesner, L.E., and Bowman, H.F. Grass and Legume Seed Production inMontana and Wyoming. Special Report No. 12. Revised 1990. 31p.

2.Montana State University, Extension Service. Montana Interagency Plant Materials Handbookfor Forage Production, Conservation, Reclamation, and Wildlife. EB 69. June 1990. Pgs. 175-185.

3.Ogle, D., St. John, L, Cornwell, J., Stannard, M., and Holzworth, L. 2008. Technical Note 10.Pasture and Range Seedings: Planning-Installation-Evaluation. USDA-Natural Resources