FSC 102 Propagation of Horticultural Crops (2 + 1)

Aim

To impart knowledge on multiplication and maintenance of horticultural propagules.

Theory

Unit I Introduction and components of propagation

Scope and importance of plant propagation - establishment of nursery - site selection - tools and implements - mist chamber - phytotron - humidifiers - greenhouse - glasshouse - polyhouse - shade net - cold frames - hot beds - pit nursery - ball and burlapping - media and containers - soil sterilization - manures and manuring - liquid manures - agencies involved in the nursery development - government schemes for development of nurseries.

Unit II Sexual propagation

Importance, advantages and disadvantages - micro and megasporogenesis - apomixis - mono and polyembryony - seeds - quality - nursery bed - protrait culture - sowing - seed viability - longevity - germination - dormancy - types of dormancy - seed treatments - seed invigoration - seedling vigour.

Unit III Asexual propagation - cutting and layering


Unit IV Asexual propagation - grafting, budding and propagation through specialized plant parts


Unit V Techniques of micropropagation

Micro propagation - status of micropropagation in India - different methods - protocol of micropropagation - Stage I: establishment and sterilization - Stage II: shoot multiplication -

**Practical**

Media and containers - tools and implements - structures for propagation - preparation of nursery beds for raising rootstocks and seedlings - seed treatment - sowing - plug transplants - potting, depotting and repotting of plants – preparation of growth regulators for propagation - scion bank - methods of asexual propagation - cuttings, layering, grafting, budding and specialized plant parts - hardening of propagules - project preparation for commercial nurseries – visit to commercial nurseries and tissue culture units.

**Lecture schedule**

1. Scope and importance of plant propagation
2. Establishment of nursery and site selection
3. Propagation structures, mist chamber, shade net, phytotron, humidifiers, green house, poly house, hot beds, pit nursery and ball and burlapping
4. Media and containers, soil sterilization, manures and manuring and liquid manures
5. Agencies involved in the development of nursery, government schemes and economics
6. Importance, advantages and disadvantages of sexual propagation
7. Micro and megasporogenesis, apomixes, mono embryony and poly embryony
8. Seed quality, dormancy, types of dormancy, viability, germination, longevity, seedling vigour and seed invigoration
9. Seed treatments in sexually propagated crops, formation of nursery bed and plug transplant production
10. Importance, advantages, disadvantages and methods of asexual propagation
11. Identification of plus trees, mother block, scion bank and clonal nursery
12. Genetic variations, chimeras and types
13. Types of cuttings, factors influencing rooting of cuttings and use of growth regulators
14. Advantages and disadvantages and methods of layering
15. Anatomical and physiological basis for rooting
16. Advantages, disadvantages and methods of grafting
17. **Mid semester examination**
18. Rootstocks and factors for successful graft union
19. Budding methods and techniques
20. Selection, precuring and collection of scion, bud wood and certification
21. Top working, anatomical and physiological basis of bud and graft union
22. Influence of stock on scion, scion on stock, interstock and methods of graft incompatibility
23. Propagation through specialized plant parts viz., tubers, corms, bulbs, rhizome, runner, off shoot, crown, slip, sucker and offshoots.
24. Hardening of plants in nurseries and maintenance
25. Quality management, quality standards and nursery act
26. Display, packing, transport and marketing of nursery plants
27. Status of micropropagation in India
28. Different methods – protocols of micropropagation – stage I, Establishment and sterilization – stage II
29. Shoot multiplication – stage III and root formation – stage IV
30. Acclimatization and hardening, specific protocol for aseptic culture
31. Explants, sterilization techniques, types, composition and preparation of media
32. Meristem tip culture and micro-grafting
33. Invitro propagation of commercially important horticultural crops
34. Aftercare, packing, transport and marketing, constraints in micro-propagation

Practical schedule
1. Media, containers, tools and implements for propagation
2. Propagation structures viz., mist chamber, poly house, shade net house, cold frames and hot beds and their maintenance
3. Preparation of nursery beds for raising rootstocks and seedlings, seed treatment, sowing and plug transplants
4. Potting, depotting, repotting of plants
5. Preparation of growth regulators for plant propagation and scion bank
6. Techniques of propagation through leaf cuttings
7. Techniques of propagation through stem cutting
8. Techniques and methods of layering
9. Techniques and methods of layering
10. Techniques and methods of propagation through grafting
11. Techniques and methods of propagation through grafting
12. Techniques and methods of propagation through budding.
13. Propagation through specialized plant parts
14. Hardening of propagules
15. Project preparation for establishment of commercial nurseries
16. Visit to private nurseries and commercial tissue culture units
17. Final practical examination.

REFERENCES

Text Books

Further reading


Journals

1. Journal of Horticulture Sciences and Biotechnology
2. Acta Horticulture
3. Plant Cell Reporter
4. Indian Journal of Horticulture

Web resources

1. http://www.biotech / tissue culture techniques.com
FSC 103 Production Technology of Tropical and arid Zone Fruit Crops (2 + 1)

Aim
To impart knowledge on the principles and cultivation of tropical and arid zone fruit crops.

Theory

Unit I Principles and cultivation of tropical fruits
Scope and importance of tropical fruits - global, national and regional levels - area, production and export potential - horticultural zones of India and Tamil Nadu with emphasis on tropical fruits - GAP and organic production
Crops: Mango and banana
Composition and uses - origin and distribution - species - climate and soil requirements - species and varieties - propagation techniques - planting systems and planting density - after care - water management, macro and micronutrient management, weed management - cropping systems - special horticultural techniques - use of plant growth regulators - harvest and yield - production constraints - physiological disorders - post harvest handling.

Unit II Tropical fruits
Crops: Papaya, sapota and guava
Composition and uses - origin and distribution - climate and soil requirements - varieties - propagation techniques - planting systems and planting density - after care - water management, macro and micronutrient management, weed management - cropping systems - special horticultural techniques - use of plant growth regulators - harvest and yield - production constraints - physiological disorders - post harvest handling.

Unit III Tropical fruits
Crops: Acid lime, sweet orange and jackfruit
Composition and uses - origin and distribution - climate and soil requirements - varieties - propagation techniques - planting systems and planting density - after care - water management, macro and micronutrient management, weed management - cropping systems - special horticultural techniques - use of plant growth regulators - harvest and yield - production constraints - physiological disorders - post harvest handling.

Unit IV Arid zone fruits
Scope and importance of dry land horticulture in India and Tamil Nadu.
Crops: Aonla, ber, pomegranate and date palm
Composition and uses - origin and distribution -- climate and soil requirements - varieties - spacing and planting patterns for rainfed horticulture - *in situ* grafting and budding techniques - mulching - soil and moisture conservation methods - application of anti-transpirants - water, weed and nutrient management practices - cropping systems - special horticultural practices - use of plant growth regulators - harvest and yield - production constraints - post harvest handling.

**Unit V Arid zone fruits**

**Crops:** Custard apple, jamun, bael, wood apple and manila tamarind

Composition and uses - species and cultivars - climate and soil requirements - varieties - spacing and planting patterns - cropping systems - soil and moisture conservation methods - management of nutrients, water, weeds - special horticultural practices - use of plant growth regulators - harvest and yield - production constraints - post harvest handling.

**Practical**

Description and identification of cultivars/varieties - nursery preparation, seed sowing and raising seedlings / rootstocks, practicing propagation techniques of mango, banana, papaya, sapota, guava, acid lime, sweet orange, aonla, ber, pomegranate, date palm, custard apple, jamun, bael, wood apple and manila tamarind. Banana scoring techniques. Selection and pre-treatment of banana suckers - desuckering in banana - planting systems - manures, fertilizers and biofertilizers application in mango, banana, papaya, sapota, guava, acid lime, sweet orange and aonla - application of growth regulators - sex forms in papaya - latex extraction and preparation of crude papain - training and pruning in mango, sapota, guava, acid lime and sweet orange, aonla, ber, pomegranate and date palm - practicing harvesting methods - ripening of fruits - grading and packaging - visit to commercial orchards - project preparation for commercial cultivation of fruit crops.

**Lecture Schedule**

1. Scope and importance - overview: global, national and regional level. Area, production, export potential, past and present status of fruits in India
2. General appraisal of fruit growing regions / zones in India and Tamil Nadu - special features of tropical and arid zone fruits - GAP - organic production.
3. Mango - composition and uses - origin and distribution - varieties - Climate and soil requirements.
5. Flowering, fruit set, bearing problems – special horticultural techniques - production constraints - physiological disorders.


8. Manuring - nutrient deficiency and management - irrigation and weed management - special horticultural techniques

9. Physiological disorders – production constraints – harvesting - post harvest handling - ripening of fruits - storage and processing


11. Thinning - use of growth regulators - production constraints - harvesting - latex extraction - postharvest handling - storage - processing.

12. Sapota - composition and uses - origin and distribution - climate and soil requirements - varieties - propagation - planting requirements - manures and manuring.


15. Use of growth regulators - bending - bahar treatments - production constraints - harvesting - postharvest handling - storage - processing


17. Mid semester examination

18. Sweet orange - composition and uses - origin and distribution - climate and soil requirements - varieties - propagation - planting system - manures and manuring.-
nutrient deficiency and management - weed and water management - use of growth regulators - physiological disorders - production constraints - harvesting - postharvest handling - storage - processing.

19. Jackfruit - composition and uses - origin and distribution - climate and soil requirements - varieties - propagation - planting system - manures and manuring - nutrient deficiency and management - weed and water management

20. Use of growth regulators - production constraints - harvesting - postharvest handling.

21. Dryland horticulture - importance and scope in India and Tamil Nadu - distribution of arid and semi-arid zones in India and Tamil Nadu - Present status, overview: national and regional level.

22. Cropping systems and intercropping - crops suitable for dry land system - spacing and planting patterns for rainfed horticultural crops

23. Special practices - *in situ* grafting and budding - mulching - Soil and moisture conservation methods - application of anti-transpirants for cultivation of arid zone fruits


26. Pomegranate - composition and uses - origin and distribution - climate and soil requirements - varieties - propagation - planting density - nutrient, weed and water management - training and pruning

27. Growth regulation by chemical regulators and harvest - production constraint - grading - postharvest handling.


29. Date palm - composition and uses - origin and distribution - climate and soil requirements - varieties - sex forms - propagation - planting density - nutrient, weed
and water management - growth regulation - harvest - production constraints - grading - postharvest handling.

30. Jamun - composition and uses - origin and distribution - climate and soil requirements - varieties - propagation - planting density - nutrient, weed and water management - training and pruning - use of growth regulators - harvest - production constraints - grading - postharvest handling

31. Wood apple - composition and uses - origin and distribution - climate and soil requirements - varieties - production constraints - propagation - planting density - nutrient, weed and water management - growth regulators - production constraints - harvest - grading - postharvest handling

32. Bael - composition and uses - origin and distribution - climate and soil requirements - varieties - propagation - planting density - nutrient, weed and water management

33. Use of growth regulators - harvest - production constraints - grading - postharvest handling in bael.

34. Manila tamarind - composition and uses - origin and distribution - climate and soil requirements - varieties - propagation - planting density - nutrient, weed and water management training and pruning - use of growth regulators - harvest - production constraints - grading - postharvest handling

Practical

1. Study of mango varieties
3. Study of banana varieties and their genome classification and scoring techniques.
4. Banana sucker treatment and desuckering practices.
5. Practices in planting, growth regulation treatments and special practices in banana.
6. Visit to mango and banana fields
7. Study of sapota varieties, propagation and planting
8. Study of papaya varieties, propagation and thinning of plants
9. Papain extraction and its cost economics
10. Study of guava propagation techniques and varieties.
11. Study of varieties and propagation techniques for acid lime and sweet orange
12. Study of varieties and propagation techniques for aonla, pomegranate custard apple, Jamun, bael and manila tamarind
13. Visit to fields of arid zone fruit crops
14. Assessment of maturity standards for tropical and arid zone fruit crops.
15. Practices in harvesting and postharvest handling of major tropical and arid zone fruit crops
16. Project preparation for commercial cultivation of tropical and arid zone fruit crops
17. Practical examination.

REFERENCES

Text Books

Further reading

Journals
1. Journal of Indian Horticulture
2. Journal of Acta Horticulture
3. Journal of Progressive Horticulture
4. Journal of Chronica Horticulture

Web resources
1. www.fruits-mg.com
2. www.fruits.com
3. www.hort.purdue.edu/newcrop/morton
4. www.bouquetoffruits.com
VSC 102 Production Technology of Tropical Vegetable Crops (2 + 1)

Aim

To impart knowledge on the production technology of tropical vegetable crops

Theory

Unit I  Scope and importance of tropical vegetables

Scope and importance- area and production, global and national scenario, institutions involved in vegetable crops research - export potential- classification of vegetable crops - vegetable production in nutrition garden, kitchen garden, truck garden, market garden, roof garden, floating garden – types of vegetable farming - contract farming- rice fallow cultivation, river bed cultivation, rainfed cultivation, organic farming – GAP in vegetable production – export standards of vegetables.

Unit II  Solanaceous and Malvaceous vegetable crops

Crops: Tomato, brinjal, chilli and bhendi


Unit III  Cucurbitaceous vegetable crops

Crops: Ash gourd, pumpkin, bitter gourd, snake gourd, ribbed gourd, bottle gourd, watermelon, musk melon, coccinia, cucumber and gherkin.


Unit IV  Legumes and greens

Crops: Cluster beans, cowpea, lab-lab, moringa, chekurmanis, palak, basella and amaranth.

Area and production- composition and uses - climate and soil requirements – season- varieties and hybrids – seed rate- nursery practices - containerized transplant production and transplanting - preparation of field - spacing - cropping systems - planting methods - manuring

Unit V Bulbous and Tuber crops

Crops: Onion, cassava, sweet potato, colocasia, vegetable coleus, elephant foot yam, edible dioscorea and yam bean


Practical

Identification and description of tropical vegetable crops - layout of kitchen garden- nursery practices and transplanting - preparation of field and sowing /planting for direct sown/ transplanted vegetable crops - manures and fertilizer application/ fertigation schedule and intercultural operations - growth regulators - identification of nutrient deficiencies - physiological disorders - harvest indices and maturity standards - post harvest handling and storage - marketing - cost of cultivation - project preparation for commercial cultivation - visit to commercial vegetable growing areas, market and processing centre.

Lecture schedule

1. Area, production, world scenario, industrial importance, export potential of tropical vegetable crops and institutions involved in vegetable crops research. Classification of vegetable crops.
2. Effect of climate, soil, water and nutrients on vegetable crop production and their management. Cropping systems in vegetable crops.
4. Tomato - composition and uses- area and production- climate and soil requirements - season - varieties and hybrids - seed rate - nursery practices - containerized transplant
production and transplanting - preparation of field - spacing - planting systems - planting methods.


8. Chilli - composition and uses - area and production - climate and soil requirements - season - varieties and hybrids - seed rate - nursery practices - containerized transplant production and transplanting - preparation of field - spacing - planting systems - planting methods.


12. Snake gourd and ribbed gourd - composition and uses - area and production - climate and soil requirements - season - varieties and hybrids - seed rate - nursery practices - containerized transplant production and transplanting - preparation of field - spacing - planting systems - planting methods.


17. **Mid-semester examination**

18. Coccinea, Cucumber and gherkin - composition and uses- area and production- climate and soil requirements - season - varieties and hybrids -seed rate - nursery practices - containerized transplant production and transplanting- preparation of field - spacing - planting systems - planting methods.


21. Cluster beans - composition and uses- area and production- climate and soil requirements - season - varieties and hybrids -seed rate - nursery practices - containerized transplant production and transplanting- preparation of field - spacing - planting systems - planting methods - manuring and nutrient management - water and


chemical and growth regulators - constraints in production - harvest - yield and storage - seed production.

29. Cassava - composition and uses - area and production - climate and soil requirements - season - varieties and hybrids - seed rate - nursery practices - containerized transplant production and transplanting - preparation of field - spacing - planting systems - planting methods.


32. Colocasia and Vegetable coleus - Composition and uses - area and production - climate and soil requirements - season - varieties and hybrids - seed rate - nursery practices - containerized transplant production and transplanting - preparation of field - spacing - planting systems - planting methods - manuring and nutrient management - water - use of chemical and growth regulators - constraints in production - harvest - yield and storage.


34. Dioscorea and xanthosoma - composition and uses - area and production - climate and soil requirements - season - varieties and hybrids - seed rate - nursery practices - containerized transplant production and transplanting - preparation of field - spacing - planting systems - planting methods - manuring and nutrient management - water and weed management - fertigation - nutrient deficiencies - physiological disorders - use of chemical and growth regulators - constraints in production - harvest - yield and storage.

Practical schedule
1. Preparation of nursery, containerized transplant production and sowing of seeds for solanaceous vegetable crops.
2. Preparation of field and sowing of direct sown vegetable crops.
3. Preparation of field, sowing of cucurbitaceous, perennial and leafy vegetable crops and tuber crops.
4. Identification and description of species and varieties of tomato, brinjal and chilli. Working out cost-benefit ratio.
5. Identification and description of species and varieties of bhendi, amaranth, cluster beans, vegetable cowpea and lab-lab. Working out cost-benefit ratio.
7. Identification and description of cultivars and wild relatives of tuber crops. Working out cost-benefit ratio.
8. Planning and lay out of kitchen/nutrition garden.
9. Study of rainfed cultivation practices in vegetable crops.
10. Study of drip and fertigation, basal dressing, top dressing and foliar spray of fertilizers for vegetable crops.
11. Identification of weeds, preparation of herbicide spray fluids and their usage in the field. Working with the economics of weed management.
12. Preparation of growth regulator spray solution- their usage in tropical vegetable crops.
13. Identification of nutrient deficiencies, physiological disorders and corrective measures in vegetable crops.
14. Maturity indices, harvesting and seed extraction.
15. Visit to commercial vegetable growing area/markets.
16. Project preparation for commercial cultivation of tropical vegetable crops.
17. Practical Examination.

REFERENCE

Text Books

Further reading


Journals

1. Indian Journal of Horticulture
2. Indian Journal of Vegetable sciences
3. Indian Horticulture
4. International Journal of Vegetable Science
5. Scientia Horticulture
6. Green farming

Web resources

1. http://www.informaworld.com/smpp/title~db=all~content=g904622674
AGR 102  Fundamentals of Agricultural Meteorology  (1+1)

Theory:

Unit - I:

Meteorology - Agricultural Meteorology - Importance and scope in crop production - Co-ordinates of India and Tamil Nadu - Atmosphere - Composition and vertical layers of atmosphere (stratification) - Climate - Weather - Factors affecting climate and weather - Climatic types - Different agricultural seasons of India and Tamil Nadu and climatic characteristics of India.

Unit - II:


Unit - III:

Atmospheric pressure - Pressure systems - cyclones, anticyclones, tornado, hurricane and storms - Wind systems of the world - Inter Tropical Convergence Zone. Clouds - types and their classification. Precipitation - forms - monsoon - Seasons of India- rainfall variability drought, flood and their effect - Cloud seeding - Evaporation - transpiration - Evapotranspiration - PET.

Unit - IV:

Agro climatic Zones of India and Tamil Nadu - Agro climatic normals - Weather forecasting - synoptic chart - crop weather calendar - Remote sensing and crop weather modeling - Impact of climate and weather on crop production and pest and diseases.

Unit - V:

Climate change- climate variability - definition and causes of climate change - Impact of climate change on Agriculture, Forestry, Hydrology, marine and coastal ecosystem

Practical:

Theory - Lecture Schedule:

1. Meteorology - Agricultural Meteorology - Definition, their importance and scope in crop production.
3. Climate and weather - Factors affecting climate and weather. Macroclimate - Meso climate - Microclimate - Definition and their importance - Different climates of India and Tamil Nadu and their characterization.
8. Mid Semester Examination.
9. Atmospheric pressure, diurnal and seasonal variation - Pressure systems of the world - causes for variation - Isobar - Low, depression, anticyclone, Tornado, hurricane.
10. Wind systems of the world - Inter Tropical Convergence Zones (ITCZ), wind speed in different seasons -. Clouds and their classification - Concepts of cloud seeding - present status.
13. Weather forecasting - Types, importance, Agro Advisory Services - Synoptic chart - Crop weather calendar.

15. Effect of weather and climate on crop production, soil fertility and incidence of pest and diseases.

16. Climate change, climate variability - definition and causes of climate change including ENSO.

17. Impact of climate change on Agriculture, Forestry, Hydrology, marine and coastal ecosystem.

**Practical schedule:**

1. Site selection and layout for Agromet Observatory - Calculation of local time - Time of observation of different weather elements - Reviewing agromet registers.

2. Measurements of solar radiation (pyranometers), sunshine hours (sunshine recorder) - working out weekly and monthly mean for graphical representation.

3. Measurement of air and soil temperature and grass minimum thermometers and thermographs - drawing isolines.


5. Measurement of atmospheric pressure - barograph - Fortein-s barometer - Isobars based on past data for different seasons.


8. Heat Unit concept- GDD, HTU, PTU for fixing time of sowing.


10. Drawing Synoptic charts for understanding weather.

11. Preparation of crop weather calendars and forecast based agro advisories

12. Preparation pest weather calendar and pest forewarning.

13. Estimation of length of growing periods using weekly rainfall data.


15. Identification of efficient cropping zone- RYI, RSI.


17. **Practical Examination.**
OBJECTIVE

- To gain basic knowledge of the biomolecules \textit{viz.}, Carbohydrates, Proteins and Lipids - properties, structure and metabolism.
- To learn basics of enzymes

Theory

UNIT I Carbohydrates

Carbohydrates - occurrence and classification. Structure of monosaccharides, \textit{oligosaccharides} and polysaccharides. Physical and chemical properties of carbohydrates – optical isomerism,
optical activity, mutarotation, reducing property, reaction with acids and alkalies. 

**Glycoconjugates - Glycoproteins and Lectin - structure and significance.**

**UNIT II  Lipids**

Lipids - occurrence and classification. Storage lipids - fatty acids, triacyl glycerol, essential fatty acids, waxes. **Structural lipids - role of lipids in biological membrane - glycolipids and phospholipids - types and importance; Sterols - basic structure and their importance.** Physical and chemical constants of oils. Rancidity of oils.

**UNIT III  Proteins and Enzymes**


**UNIT IV Metabolism**


**UNIT V  Secondary metabolites**

Secondary metabolites - occurrence, classification and functions of phenolics, terpenes and alkaloids.

**Lecture schedule**

2. Structure of monosaccharides. R2: 75-82.
10. Sterols - basic structure and their importance. R2: 111-114.
17. MIDSEMESTER EXAMINATION

Practical
1. Qualitative analysis of carbohydrates
2. Estimation of starch
3. Estimation of amylase
4. Determination of reducing sugars
5. Qualitative analysis of amino acids
6. Sorenson’s formal titration of amino acids
7. Estimation of amino acids by Ninhydrin method
8. Estimation of protein by Biuret method
9. Determination of free fatty acid of an oil
10. Determination of iodine number of an oil
11. Estimation of ascorbic acid by dye method
12. Assay of amylase
13. Estimation of total phenols
14. Extraction and estimation of lycopene and carotenoids
15. Separation of amino acids by paper chromatography
16. Separation of phenols by thin layer chromatography
17. Final Practical Examination

References


Teaching Resources

Aim

To impart basic knowledge on various functions and processes related to crop production, mineral nutrition, plant growth regulators and environmental stresses.

Syllabus

Unit I: Plant Water Relations


Unit II: Plant Mineral Nutrition

Criteria of essentiality - classification of nutrients – macro, micro, mobile, beneficial elements and immobile – mechanism of nutrient uptake- Physiological functions, deficiencies and disorders of macro and micro nutrients – Hidden hunger- Foliar nutrition- root feeding and fertigation – sand culture, hydroponics and aeroponics

Unit III: Photosynthesis and Respiration


Unit IV: Growth and Development

Growth – phases of growth - Factors affecting growth – Hormones- classifications - Biosynthetic pathway and role of auxins - Biosynthetic pathway and role of gibberellins and cytokinins- Biosynthetic pathway and role of ethylene and ABA- Novel and new generation PGR’s – Brassinosteroids and salicylic acid - Growth retardants – Commercial uses of PGR’s-
Photoperiodism - short, long and day neutral plants – Chailakhyan’s theory of flowering-
Forms of phytochrome - Pr and Pfr - regulation of flowering - Vernalisation - Theories of
vernalisation – Lysenko and Chailakhyan’s theories- Seed germination - physiological and
biochemical changes - seed dormancy and breaking methods - Senescence and abscission –
physiological and biochemical changes -Physiology of fruit ripening- climacteric and non-
climacteric fruits - factors affecting ripening- Manipulations

Unit V: Stress Physiology

Classification of stresses - Physiological changes and adaptations to drought, flooding, high
and low temperature, salinity and UV radiation – compatible osmolytes – membrane
properties -- compartmentalization – stress alleviation - Global warming – green house gases
– physiological effects on crops - Carbon Sequestration

Practicals

Preparation of different types solutions -Measurement of plant water potential by different
methods - Estimation of photosynthetic pigments- Chlorophylls and Carotenoids -
Determination of stomatal index and stomatal frequency - Measurement of leaf area by different
methods Physiological and Nutritional disorders in crops plants -Estimation of chlorophyll
Stability Index - Estimation of Relative Water Content -Determination of photosynthetic
efficiency in crop plants – soluble protein - Estimation of Nitrate Reductase activity -Growth
Analysis - Bioassay of Cytokinin and GA - Estimation of proline -Demonstration of Practical
applications of PGRs. Field visit for foliar diagnosis

Theory lecture schedule

1. Importance of Crop Physiology in Agriculture – Structure of plasma membrane, chloroplast,
mitochondria, peroxisome and vacuole

imbibition – Plasmolysis - Field Capacity and Permanent Wilting Point


4. Translocation of water – ascent of sap – mechanisms of xylem transport

5. Transpiration – significance – structure of stomata - mechanisms of stomatal opening and
closing – guttation - antitranspirants

and immobile – mechanism of nutrient uptake
7. Physiological functions and disorders of macro nutrients – Hidden hunger
8. Physiological functions and disorders of micro nutrients
9. Foliar nutrition- root feeding and fertigation - sand culture, hydroponics and aeroponics
10. Light reaction – photolysis of water and photophosphorylation - Z scheme
11. Photosynthetic pathways – C₃ and C₄ cycles
12. CAM pathway – difference between three pathways - Factors affecting photosynthesis.
13. Photorespiration – pathway and its significance
14. Phloem transport – Munch hypothesis - Phloem loading and unloading - Source and sink strength and their manipulations
15. Glycolysis – TCA cycle
16. Oxidative phosphorylation – difference between photo and oxidative phosphorylation - energy budgeting - respiratory quotient
17. Mid Semester Examination
19. Biosynthetic pathway and role of auxins
20. Biosynthetic pathway and role of gibberellins and cytokinin
21. Biosynthetic pathway and role of ethylene and ABA
22. Novel growth regulators – Brassinosteroids and salicylic acid – New Generation PGR’s
23. Growth retardants and inhibitors -commercial uses of PGR’s
24. Photoperiodism - short, long and day neutral plants – Chailakhyan’s theory of flowering
25. Forms of phytochrome - Pr and Pfr - regulation of flowering
26. Vernalisation - theories of vernalisation – Lysenko and Chailakhyan’s theories
27. Seed germination - physiological and biochemical changes - seed dormancy and breaking methods
28. Senescence and abscission – physiological and biochemical changes
29. Physiology of fruit ripening- climacteric and non climacteric fruits - factors affecting ripening and manipulations
30. Drought - physiological changes - adaptation - compatible osmolytes - alleviation

31. High and low temperature stress – physiological changes - membrane properties - adaptation

32. Salt stress - physiological changes - adaptation - compartmentalization - alleviation

33. Flooding and UV radiation stresses – physiological changes - adaptation

34. Global warming – green house gases –physiological effects on crop productivity- Carbon Sequestration

**Practicals schedule**

1. Preparation of different types solutions

2. Measurement of plant water potential by different methods

3. Estimation of photosynthetic pigments- chlorophylls and Carotenoids

4. Determination of stomatal index and stomatal frequency

5. Measurement of leaf area by different methods

6. Physiological and Nutritional disorders in crops plants

7. Estimation of chlorophyll Stability Index

8. Estimation of Relative Water Content

9. Determination of photosynthetic efficiency in crop plants – soluble protein

10. Estimation of Nitrate Reductase activity

11. Growth Analysis - LAI, LAD, SLA, SLW, LAR, NAR, RGR, CGR and HI

12. Bioassay of Cytokinin

13. Bioassay of GA

14. Estimation of proline

15. Demonstration of Practical applications of PGRs.

16. Field visit for foliar diagnosis

17. Final Practical Examination

**Outcome**
Students will come to know basic knowledge on various functions and processes related to crop production, mineral nutrition, plant growth regulators and environmental stresses. In addition, hands on exposure to preparation of solutions, analysis of pigment composition, estimation of growth analytical parameters, diagnosis and correction of nutrient deficiencies, enzyme assays and demonstration of plant growth regulator applications.

Text books


E-books and e-references

- http://www.plantphys.org
- http://4e.plantphys.net

AEC101 Principles of Economics (1+1)

Objective

This course aims to introduce the basic principles of economics including the problem of economic decision-making, laws of economics and macroeconomic concepts.

Theory

Unit 1: Nature and Scope of Economics

Unit 2: Theory of Consumption


Unit 3: Theory of Production


Unit 4: Exchange and Theory of Distribution

Exchange and Distribution: Definition - Pricing of factors of production - Marginal productivity theory of distribution - Rent and Quasi rent - Wages: Real wage and money wage - Interest: Pure interest and gross interest - Profit: Meaning of economic profit.

Unit 5: Macroeconomic Concepts


Practical


**Theory Schedule**

5. Law of Equi-marginal Utility: Definition, Assumptions, Limitations and Applications - Indifference curve analysis: Definition and properties of indifference curves and budget line.
6. Demand: Definition, Kinds of demand, Demand schedule, Demand curve, Law of Demand, Determinants of demand - Extension and contraction of demand Vs. Increase and decrease in demand.
7. Elasticity of Demand: Own price, cross price and income elasticities of demand, Degrees of price elasticity of demand, Factors influencing elasticity of demand and Importance of Elasticity of demand.
9. **Mid Semester Examination.**
15. Wages: Real wage and money wage - Interest: Pure interest and gross interest - Profit: Meaning of economic profit.

**Practical Schedule**

1. Elucidation of 10 principles of economics.
3. Indifference Curve Analysis: Properties, budget line and consumer equilibrium.
5. Estimation of own price, income and cross price elasticities of demand - Estimation of consumer surplus.
6. Law of Diminishing Marginal Returns: Relationship among TPP, APP and MPP.
7. Cost concepts: Total cost, total fixed costs, total variable cost, average costs, marginal costs and Graphical derivation of cost curves - Estimation of total revenue and profit.
10. Rent: Theories of Rent: Ricardian and Modern theories of rent - Wages: Determination of wages: Marginal productivity theory and Demand and supply theory of wages.
13. Estimation of Growth Rate of Population and Food grain production.
15. Consumer price index and Wholesale price index - Estimation of price indices.
16. Measures of standard of living and human development – Human Development Index – Physical Quality of Life Index – Gender Development Index.
17. Practical Examination.

References
Unit I - Introduction to Environmental Science

Environmental Science – Interrelationship with other sciences - Scope – Concepts - Segments - Global Environmental initiatives and perspectives – Environmental Sustainability – Ecological footprint

Unit II - Ecology and Ecosystems


Unit III- Biodiversity and conservation


Unit IV- Natural Resources


Unit V- Environmental problems and Protection

Green House Gases-Global warming- Climate change-Impact on agriculture and other natural resources-Environmental pollution-Introduction to soil, water and air pollution -impact on agriculture and environment

Environmental protection-Global treaties - Conventions – National and state level organizations: TNPCB, CPCB -- Environmental Laws and Acts – Environmental Education

Practical Schedule:

1. Environmental Sampling and preservation
2. Assessment of biodiversity in Natural ecosystem
3. Assessment of biodiversity in River ecosystem –
4. Assessment of biodiversity in Pond Ecosystem
5. Biodiversity assessment in different farming systems: organic farm
6. Biodiversity assessment in different farming systems: Conventional farm
7. Water quality analysis: pH, EC and TDS
8. Estimation of Acidity, Alkalinity and Hardness in the water sample
9. Estimation of DO, BOD of water sample
10. Enumeration of E.coli in water sample
11. Effect of wastewater irrigation on the germination of agricultural crops (Pot culture test for germination)
Lecture Schedule

1) Introduction to Environmental Science, Interrelationship with other sciences, Scope, Concepts and Segments
2) Global Environmental initiatives and perspectives, Environmental Sustainability and Ecological footprint
3) Ecology, its Relevance to man, Ecosystem and its components
4) Biomes: Terrestrial (Forest, Desert, etc.) and Aquatic (Pond, River, Estuaries and Ocean)
5) Energy flow, Food Chain, Food Web and Ecological pyramids
6) Species interactions, adaptations and Succession
7) Biogeochemical cycles
8) Biodiversity: Types, National and Global Status, importance, Hotspots and Threats
9) Mid Semester Examination
10) Conservation of Biodiversity: In-situ and Ex-situ - Biosphere Reserves - National parks, Wildlife Sanctuaries, Botanical Garden, etc.
11) Natural and Energy resources: Land, Water, Air, Forest, Minerals, Perpetual, Renewable and Non-renewable
13) Green House Gases-Global warming- Climate change-Impact on agriculture and other natural resources-
14) Environmental pollution-Introduction to soil, water and air pollution -impact on agriculture and environment
15) Global treaties and Conventions for Environmental Protection
16) National and state level organizations: CPCB, TNPCB, etc.
17) Environmental Education, Environmental Laws and Acts

References:
Aim

To impart knowledge about the basic facts of Forestry as well as agroforestry and familiarize the students with important trees suitable for agroforestry and various agroforestry systems.

Theory
Unit I - Introduction to Forestry

Forest – Forestry – Definition, objectives, classification and historical perspectives in India. Role of forest – tangible and intangible benefits. Geographical distribution of world and Indian forests – Forest types – definition and major forest types of India - Forest cover of India as per Forest Survey of India - Definition of Silvics and Silviculture – objectives – its relation with other branches of forestry - International forestry organizations.

Unit II Forests and people

Social forestry – Definition, history, objectives - Components – Farm forestry, Extension forestry, Community forestry, Recreation forestry, Urban forestry – Benefits of social forestry - Important social forestry schemes implemented in India - Definition, origin and evolution of JFM in India – Salient features of JFM – Organisational structure in JFM- Benefit sharing mechanism

Unit III – Agroforestry concept and systems

Land use and land capability classification - Agroforestry – definition and scope – History of agroforestry – Components of agroforestry, benefits and limitations - Overview of global agroforestry - traditional agroforestry practices in Asia and India - Agroforestry system classification – structural, functional, ecological and socio-economic basis

Unit IV – Agroforestry tree species and Mensuration

Important farm grown trees - Silvicultural characters – Regeneration techniques – Tending - Rotation – Yield and Uses of Tectona grandis, Santalum album, Casuarina species, Eucalyptus species, Azadirachta indica, Melia dubia, Leucaena leucocephala, Aibizia lebbeck, Acacia nilotica, Acacia leucophloea, Acacia auriculiformis, Ailanthus excelsa, Dalbergia sissoo, Gmelina arboorea and Pterocarpus marsupium - Forest Mensuration – definition, objectives - Diameter, girth and height measurement methods–standard rules governing breast height measurement – Volume estimation in standing and felled trees

Unit V – Agroforestry practices

Agroforestry practices for arid and semi arid regions - Agroforestry for problem soils - salt affected soils, waterlogged areas – Multifunctional agroforestry – green manure, fuel wood and fodder production – agroforestry for soil and water conservation, wasteland development -
Carbon sequestration through agroforestry approaches – Timber transit rules for farm grown trees - National Agroforestry policy, 2014

**Practical**


**Theory Lecture Schedule**

1. Forests and Forestry - Definition, objectives, classification and historical perspectives in India
2. Role of forests – Tangible and intangible benefits – Geographical distribution of world and Indian forests
3. Forest types – definition and major forest types of India – Forest cover of India – International Forestry organizations - Silvics and Silviculture – definition and objectives – relation with other branches of forestry
4. Definition, history and objectives of social forestry – Components and benefits of social forestry – Important social forestry schemes implemented in India
5. Joint Forest Management – definition, origin, evolution, salient features and organisational structure- benefit sharing mechanism
6. Land use capability classification -Agroforestry – definition, scope and history
7. Agroforestry components – benefits and limitations - Overview of global agroforestry – traditional agroforestry practices in Asia and India
8. Classification of agroforestry systems – structural, functional, ecological and socio-economic basis
9. Silvicultural characters, regeneration techniques, tending, rotation, yield and uses of teak, sandalwood and red sanders
10. Mid semester examination
11. Silvicultural characters, regeneration techniques, tending, rotation, yield and uses of Casuarina species, Eucalyptus species and Ailanthus excelsa
12. Silvicultural characters, regeneration techniques, tending, rotation, yield and uses of *Azadirachta indica*, *Melia dubia*, *Dalbergia sissoo* and *Gmelina arborea*

13. Definition, objectives, scope of Forest Mensuration - Diameter, girth and height measurement methods

14. Standard rules governing breast height measurement – volume estimation of standing and felled trees - measurement of weight and biomass

15. Agroforestry practices for arid, semi arid, salt affected and waterlogged soils

16. Agroforestry practices for fuelwood, fodder production, soil and water conservation and wasteland development - Carbon sequestration through agroforestry approaches


**Practical Schedule**

1. Identification of major farm grown tree species and study its uses
2. Nursery technology of Eucalyptus species and Casuarina species
3. Nursery technology of *Azadirachta indica* and *Melia dubia*
4. Nursery technology of *Ailanthus excels* and *Leucaena leucocephala*
5. Nursery technology of *Albizia lebbeck*, *Acacia nilotica* and *Acacia leucophloea*
6. Nursery technology of *Dalbergia sissoo*, *Gmelina arborea* and *Santalum album*
7. Nursery technology of *Pterocarpus marsupium* and *Tectona grandis*
8. Visit to agrisilviculture and silvipasture model
9. Visit to Integrated Farming System
10. Designing an agroforestry model
11. Designing and establishment of wind break and shelter belt
12. Visit to pulpwood / plywood plantations
13. Studies on contract tree farming practices in Tamil Nadu
14. Estimation of volume of standing and felled trees
15. Estimation of tree biomass through various methods
16. Economics of agroforestry – Preparation of bankable projects
17. Final practical examination

**Outcome / Deliverable**

The students will gain knowledge on concepts of forestry, agroforestry and the important agroforestry systems. The students will learn about the silviculture and nursery technology of important agroforestry tree species.
Text Books


Journals

1. Agroforestry Systems, Netherlands
3. Indian Journal of Agroforestry, CAFRI, Jhansi
4. Agroforestry Today, ICRAF, Nairobi, Kenya
5. Range management and Agroforestry, IGFRI, Jhansi

E- resources

- www.worldagroforestry.org
- www.fao.org/forestry/9469/en
- www.global-saf.com
- www.agroforestry.net.au
- www.nac.unl.edu/documents/insideagroforestry/vol16issue2.pdf

ENG. 103- DEVELOPMENT EDUCATION (0+1)

(Alternate courses for non-Tamil students)

Aim:

- Basic principles of learning
- Taxonomy of educational
- Career development and entrepreneurship
- Communication skills

Lecture Schedule

2. Occupation and profession, training and education, lateral thinking and convergent thinking, teaching and learning – discussion.
3. Bloom’s classification of educational objectives – Cognitive, Affective, Psychomotor domain(s)
4. Career development – opportunity for graduates of agriculture and allied sciences – discussion
5. Success story of a farmer / entrepreneur – factors involved – role – play
6. Brainstorming – Demonstration
7. Simulation – Educational Simulation-Interactive Teaching - Business Simulation – Company’s annual report for analysis
8. Interpersonal communication – Transactional communication – ice breaker

9. MID SEMESTER EXAMINATION

10. The conduct of a symposium

11. Conferencing – the concept and presentation of a paper

12. Scientific Article Writing and Editing

13. Popular Article Writing, Editing and Blogging

14. Project proposal

15. Project Report – writing


17. FINAL PRACTICAL EXAMINATION

Text book:

Sudarsanam.R 1985. “Development Education” Chapter 1,2

Outcome:

- Understand the concepts of learning,
- The necessity for Lifelong education,
- Communication skills in terms of career development

References


TAM 101 jkpH; ,yf;fpaj;jpy; ntshz;ika[k;

mwptpay; jkpH;g; gad;gLk; (0+1)

bjhy;fhg;gpak; fhL;Lk; Kjw;bggLjs; fUg;bggLjs; - r",f; ,yf;fpaj;jpy; ntshz; bjhHpy; El;g';fs; - gpjbdz; fPH;f;fzf;F Ejy;fspy; ntshz;ik mwptpay; - gs;S ,yf;fpaj;jpy; VbuGgJ; ,yf;fpaj;jpy; ntshz; bgghwpapay; - njhl;ltapay; - ttpay; kidapay; - NHpay; ntshz;ikg; ghbkHgfs; - ,yf;fpak; fhL;Lk; thH;tpay; bewpKiws; - ,f;fhy ,yf;fpaj;jpy; ntshz;ikr; rpe;jidfs; - gpiHapd;wp vGJk; Kiws; - ,yf;fpaj;jpy; bkd;jpwd;fs; - mwptpay; jkpH; tsh;r;rp epyf;fs; fiyr;brhy;yhf;fk; - bkhHp bgah;g;ghsh; - Ml;rpj; jkpH; - cHth;SF;fhd mwptpg;[fis btspapLjy; - fl;Liur; RUf;fk; vGJjy; - fpdp cyfpy; jkpH;

bra;Kiws; gapw;rpfs;

1. bjhy;fhg;gpak; fhL;Lk; Kjw;bggLjs; fUg;bggLjs; tHp ntshz; kug[fis mwpyj;
2. r",f; ,yf;fpaj;jpy; ntshz; bjhHpy; El;g';fs; - (vl;Lj;bjhif/ gj;Jg;ghL;L)
3. gpjbdz; fPH;f;fzf;F Ejy;fspy; ntshz;ik mwptpay;
4. gs;S ,yf;fpaj;jpy; VbuGgJ - cHth; thH;tpay; bewpKiwsK; ntshz;ikj; bjhHpy; El;g';fSk;
5. ,yf;fpaj;jpy; ntshz; bgghwpapay; - njhl;ltapay; - tdpay; - kidapay; - NHpay;
6. ntshz;ikg; ghbkHgfs; - cHt[ tpij mwptpay; - ehw;W eLjy; - vU ,Ljy; - ePH;g;ghrdk; - fis nkyhz;ik - gaph;ghJfhg;g[ - mWtil - cHth; rKjhak;
7. ,yf;fpak; fhL;Lk; thH;tpay; bewpKiws;
8. ,f;fhy ,yf;fpaj;jpy; fspjy; ntshz;ikr; rpe;jidfs; - ghujp/ ghujpjhrd; gilg;g[fs; - g[Je;ftpj - rpWfij - g[jpdf;
9. ,ilepiyg; gUtj;njh;t;
10. gpiHapd;wp vGJk; Kiws; - vGJ;Jg; gpiHfs; - brhw;gpiHfs; - brhw; gphpg;g[g;gpiH - thf;fpag;gpiH - bka;g[g]; jpUj;jk;
11. ,yf;fpaj;jpy; bkd;jpwd;fs; - jiyikg;g[z;g[ - fhy nkyhz;ik
12. MSikg;gz;g[ nkk;ghL – kdpj cwtj;jpwd; fs; tsh,j;jy;
13. mwptpay; jkpH; tsh;r;r epifyfs;/ ntshz; E}y;fs/ ntshz; ,jH;fs;
14. fiyr;brhy;yhf;fk; - ntshz; fiyr; brhw;fis cUthf;Fk; Kiw – jug;gLj;Jly; - ,yf;fpa ntshz;
       fiyr;brhw;fs;/ tI;hhu ntshz;ik tHf;Fr; brhw;fs; - mfuhipapay;
15. bkhHp bgah;g[ - Kf;fpa tpjpfs; - goepiyfs; - bkhHp bgah;ghshpd; ,d;wpaikahg; gz;g[fs -
       ntshz; bra;jpfsis bkhHp bgah;j;jy;
16. Ml;rpj; jkpH; - murhizfs; mYtyf; foj;fs; - chth;SFf;hfd mwptpg;g[t;fis btspapLjy; - fl;Liur;
       RUf;fk; vGJlyj;
17. fpdp cyfpy; jkpH; - xuU';F FwpaPL gapw;Wtpj;jy; - tiyg; g{fs; - tpf;fpgPoah – ntshz;
       bra;jpfsisg; gjpntw;wk; bra;jy; - ntshz; bra;jpfsis ,izajs tHp mwpjy;

nkw;ghh;it E}y;fs;

- fe;jrhkp.,y.br.ntshz;ika[k; gz;ghLk;/ jkpH;ehL ntshz;ikg; gy;fiyf;fHfk;/ nfhak;g[ji;J]h;/ 1974
- fe;jrhkp. ,y.br.,yf;fpa;j;yj; ntshz;ik/ jkpH;ehL ntshz;ikg;gy;fiyf;fHfk;/ nfhak;g[i;J]h; 1981.
- fe;jrhkp. ,y.br. ntshz;ik ghbkhHpfs;/ fiyr;bry;tk; gjp;gfk;/ nfhak;g[i;J]h; 1983.
- FHe;i jrhkp.th.br.mwptpay; jkpH;/ ghujip gjp;gfk;/ brd;id
- kPdh;rp Rejuk.; kh. kw;Wk; V..y.trayl;Rkp jfty; bjih;gpy; jkpH; bkhHp;g;gd;ghL/ nf.Mh.;v.Mg;brl; gphpz;lh;/ nfhak; 2002
- kzpnkfly.k;jkpH; bkhHp; jlj;jpy; ntshz; mwptpaypd; RtLfs;/ ntp;j gjp;gfk;/ jpUr;ruhp;gs;sp/ 2002
- ,yf;fpaKk; ntshz;ika[k;/ mid;jpe;jpa mwptpay; jkpH;f; fHfk;/ j";rht[h;/ 2006
- jkpHhpd; kug;r;bry;t;fs;/ cyfj; jkpHuha;r;r epWtdk;/ brd;id
- re;jpunrfud;/ ,uh/ bkhHp;g;ghlk; - gilg;ghf;fj;jpwd; tsh;j;jy;
- ntshz;fiyr;brhy; ngufuhjp/ jkpH; ehL ntshz;ikg; gy;fiyf;fHfk;/ nfhak;g[i;J]h;/ 2008.
- ghnte;jd;/ ,uh/ jkpHp; mwptpay; ,jH;fs/ rhKnty;/ @gp#; fpwpd; gjp;gfk;/ nfhak;g[i;J]h;
- lhf;lh; ,uhjh bry;yg;gd;/ fiyr;brhy;yhf;fk;/ jkpH;g; gy;fiyf;fHfk;/ j";rht[h;
I Year


II Year


Practical Schedule

I Semester

1. Orientation of NSS volunteers and programme coordinator and Programme officers.
2. Origin of NSS in India and its development
3. NSS motto, symbol and NSS awards
4. Organizational set up of NSS at Central, State University and college levels.
5. Programme planning – Theme of the year – planning implementation at PC, PO and NSS volunteer level.
6. Visit to selected village - gathering basic data on socio economic status.
7. Participatory rural appraisal – studying the needs of the target group.
8. Visit of urban slum and gathering data on socio economic status.
9. Self involvement and methods of creating rapport with the target group.
10. Awareness campaign on welfare schemes of the central and state government.
11. Formation career guidance group with NSS volunteers and students welfare unit
12. Cycle rally on environmental protection.
13. Campus development activities – clean environment campaign, formation of plastic free zones.
14. Campus development, tree planting maintenance and greening the campus cleaning.
17. Final Examination.

II Semester
1-3: Motivation of rural and urban youth for formation of SHG (Self Help Groups) in collaboration with Government machineries and NGOs.
4. Campaign on ill effects of plastics in the adjoining campus areas – Villages / urban areas.
5. Campaign on Parthenium eradication.
7. Popularization of biogas and smokeless chulah.
8. Demonstration on the use of wind energy and solar energy.
10. Demonstration on soil conservation techniques wherever possible.
11. Campaign on Community health programmes of central and state Government – involving Health department officials.
12. AIDS awareness campaign; campaign on diabetes and healthy food habits and drug abuse
13. Planning formation of blood donors club – involving NGOs.
14. Campaign on gender equality and women empowerment.
15. Campaign on child health care – immunization, food habits and child labour abolition.

III Semester
1. Conducting field days with KVK to popularize improved agro techniques.
2. Conducing seminar / workshop in a nearby village to motivate the youth on agribusiness (involving DEE, KVK, NGO and local agro-entrepreneurs).
3-5 Campaign on self employment opportunities like Apiculture, mushroom cultivation, Food processing and value addition, production of biocontrol agents and biofertilizers, nursery techniques, seed production, tissue culture, vermicompost, manufacture of small gadgets and agricultural implements as per local needs and feasibility.
7. Training the NSS volunteers on road safety measures in involving traffic wardens and RTO.
8. Training NSS volunteers on First AID and emergency call involving NGOs and organizations like St. John’s Ambulance, Red Cross, etc.,
10. Motivating NSS Volunteers on small savings concept and conveying the message to the public through them.
12. Observation of National integration and communal harmony.
14 – 16 : Campus development and greening activities
17. Final Examination.

IV Semester
1 – 3 : Visit to orphanages and old age homes to look after their needs.
4. Personality development programmes – Building up self confidence in youth.
5 – 7: Teaching NSS volunteers on mediation Yoga and art of healthy living with trained teachers
8 – 9 : Visit of nearby National Monument / Places of tourist importance and campaign on cleanliness and preservation.
10-11 : Exploration of hidden talents of village youth and public on folklore, traditional art, sports, martial arts and cultural heritage.
12-13. Campus improvement activities
14-16 : Visit to special camp village and pre camp planning.
17. Final Examination.

- Besides the above, NSS volunteers will attend work during important occasions like Convocation, Farmers day, Sports meet and other University / College functions.
- NSS Volunteers will attend one special camp in the selected village for a duration of 10 days and undertake various activities based on the need of that village.
- For all out door regular activities villages / slums nearby the campus may be selected to avoid transport cost (cycle able distance)
- Special camp activity will be conducted in a village situated within a radius of 15 – 20 KM.

EVALUATION

A. Regular activities

60 marks = I Semester 15 marks
II Semester 15 marks
(Written test 10 marks - participation in programmes and behavior-5 marks) 80% attendance is mandatory for attending special camp

B. Special camp activities

a. Attendance in daily activities : 30 marks during special camp
b. Special camp activity report : 5 marks
c. Viva-voce on the 10th day : 5 marks of the special camp

-------------------
Total : 40 marks
-------------------

PED 101 Physical Education 0+1
Practical

(17 Practical classes – 2½ hours each class – 17 classes will be converted into 40 practical hours and 2½ hours for evaluation)

I Semester (20 Hours)

Exercises for strength, agility, co-ordination, flexibility, co-operation, vital capacity endurance, speed and for various systems of our body and team spirit.
Exercise for Good Posture – Conditioning and calisthenics for various Athletic activities

i.e (a) Before start – Arm stretch, hand stretch and cat stretch (b) Loosening up jogging, bending and twisting (c) Standing – Lateral Arc, triangle and hands to feet pose (d) Sitting – camel kneel, spinal twist and supine knee bend (e) Relaxation – The corpse pose, quick and deep relaxation. Basic gymnastic exercises – participation of athletic events – running, throwing and jumping events.

Skill development in anyone of the following games

Warming up, suitable exercise, lead up games, advance skill for all the games.

Basket Ball: Dribbling, pass, two or three men pass, pivot, lay up shot, shooting, pass break, hook pass, screening, positional play, defence and offence tactics.

Volley Ball: Fingering, under arm pass, over head pass, setting, spiking, back pass, jump pass, stunts, elementary dive, flying dive, roll, blacking and various types of services.

Ball Badminton: Grip, service, foot work, fore hand stroke, back hand stroke, lob, smash, volley, wall practice, spin service and defence tactics.

Foot ball: Dribbling, passing, dodging, kicking, heading, screening, chest pass, throwing, dragging, goal kick, defence and offence tactics.

Hockey: Grip, bully, dribbling, hitting, drive, push strokes, scoop, flick, stopping, various types of passes, dodging, defence and offence tactics.

Kho-Kho: Quadra ped, bi-ped, how to given kho, taking a direction, recede, parallel toe method, bullet tow method, distal method, foot out, dive, ring game, chains and pursue and defence skills.

Chess: Moves, move of king, move of pawns, move of rooks, move of bishops, move of queen, move of knights, en passant, castling, check and notation.

Kabaddi: Raid, touch, cant, catch, struggle, various types of defence and offence tactics.
Cricket : Grip, bowling, spin, leg spin, off spin, medium, batting, dive, sweep, mode of delivery, fielding, rolling etc.

Tennis : Grip, forehand drive, back hand drive, stroke, backhand ground stroke, service, volley, smash, wall practice, foot work, defence and offence tactics.

Table Tennis : Grip, tossing and serving, spin serve, rally, smash, flick, defence and offence tactics.

Shuttle Badminton : Grip, foot work, service, setting, smash, volley, forehand and back hand stroke, back hand serve and defence.

Gymnastics : Balanced walk, execution, floor exercise, tumbling/acrobatics, grip, release, swinging, parallel bar exercise, horizontal bar exercise, flic-flac-walk and pyramids.

ATHLETICS

(a) Sprint : Medium start, long start, bunch start, set, pick up, finish, upsweep, downsweep, placement, receiving and exchanging.

(b) Jumps : Western roll, belly roll, eastern cut off, fass ferry flop, approach, take off, straddle, hitch-kick, handging, clearance, landing, strides etc.

(c) Throws : Grip, momentum, pre shift, sub phase, the wind up, foot work, entry to the turn, shift, angle of release, follow throw, delivery, front cross step, rear cross step, hop step, fuck method pary obraine, discoput, rotation, carry and glide.

(d) Hurdles : Finding lead leg, use of lead leg and trial leg, flight, clearing, finish.

Lead up games, advance skills and game for any one of the above games.

II Semester (20+ 2 ½ hours)

Rules and regulations of anyone of the games and athletic events.

Aims and objectiaves of yoga – asanas : ie. padmasana, pujankasana, sarvangasana, chakrasana,dhanurasana, halasana, mayurasana and savasana, asanas for ailments, back pain, arthritis, abdominal problems, stress, fatigue, Insomnia, obsity, circulation, hypertension, varicose veins, respiration, heart, digestion, headaches, depression, addiction and eye problems.

Mental balance and importance – development of concentration suriyanamaskar – advance skills of any one of the games which were taught in the I semester.
METHOD OF EVALUATION:

a. Attendance 60 Marks
b. Behavior 10 Marks
c. Participation in Sports and Games 20 Marks
d. Final Viva Voce 10 Marks

Marks will be awarded at the end of the IV Semester based on the above method of evaluation procedure. Final class grade chart of each student will be sent to the Dean of concerned colleges of Tamil Nadu Agricultural University.
PED 102 - YOGA FOR HUMAN EXCELLENCE (0+1)

Optional course (Two semesters)

Semester - II

UNIT - 1: SCIENCE OF ENERGY AND CONCIOUSNESS


UNIT - 2: YOGA PRACTICES - II


Chin mudra - Vayu mudra - Sunya mudra - Prithivi mudra - Varuna mudra - Prana mudra - Apana mudra - Apana vayu mudra - Adhi mudra.
<table>
<thead>
<tr>
<th>Class</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Who am I? – Crown centre meditation- (Thuriyam) - Simplified Physical Exercises Full exercises</td>
</tr>
<tr>
<td>2</td>
<td>Energy and Consciousness - Absolute space - Genetic centre meditation Practice - Salutation to Nature</td>
</tr>
<tr>
<td>3</td>
<td>Characteristics and capabilities of Absolute space – Magnetism - Absolute Space meditation - Simplified Physical Exercises - Asanas: - Thadasana – Ekapathasana – Chakrasana (sideways) – Thirikonasana</td>
</tr>
<tr>
<td>4</td>
<td>Five perception centres meditation - Five perception centres meditation explanation - Thandasana – Vajrasana – Padmasana - Januseerasana - Pachimothasana – Ustrasana - Kayakalpa</td>
</tr>
<tr>
<td>5</td>
<td>Five elements and solar family meditation - Five elements and solar family meditation explanation - Salutation to Nature Bhujangasana – Salabasana – Makkarasana - Kayakalpa</td>
</tr>
<tr>
<td>7</td>
<td>Sixth sense of human being - Genetic centre meditation Practice - Chin mudra – Vayu mudra – Sunya mudra – Prithivi mudra – Varuna mudra – Prana mudra – Apana mudra – Apana vayu mudra – Adhi mudra - Kayakalpa</td>
</tr>
<tr>
<td>8</td>
<td>Genetic centre and functions - Purification of genetic centre imprints in living bodies - Absolute Space meditation - Salutation to Nature - Kayakalpa</td>
</tr>
<tr>
<td>9</td>
<td>Differences in men - Five perception centres meditation - Simplified Physical Exercises Full exercises - Kayakalpa</td>
</tr>
<tr>
<td>11</td>
<td>Cause and Effect system - Crown centre meditation- (Thuriyam) - Bhujangasana – Salabasana – Makkarasana - Kayakalpa</td>
</tr>
<tr>
<td>13</td>
<td>Management techniques – (Stress – Emotional – Self – Conflict) - Absolute Space meditation - Salutation to Nature - Kayakalpa</td>
</tr>
<tr>
<td>14</td>
<td>Management techniques – (Self identity - Self Monitoring - Group dynamics - Team Management) - Five perception centres meditation - Simplified Physical Exercises Full exercises – Kayakalpa</td>
</tr>
<tr>
<td>15</td>
<td>Effective Examination Preparation - Five elements and solar family meditation - Salutation to Nature - Kayakalpa</td>
</tr>
<tr>
<td>16</td>
<td>Effective Examination Preparation - Crown centre meditation- (Thuriyam) - Simplified</td>
</tr>
</tbody>
</table>
Outcome: The course will improve the memory power, concentration in education, improvement of health of the body and main. Hence the students will excel in their career.

Semester - II

Reference books:

1) Yoga for modern age - Thathuvagnani Vethathiri Maharishi
2) Journey of Consciousness - Thomas Fitzgerald
3) Unified force - Thathuvagnani Vethathiri Maharishi
4) The History of Universe and living beings - Thathuvagnani Vethathiri Maharishi
6) Simplified Physical Exercises - Thathuvagnani Vethathiri Maharishi
7) Kayakalpam - Thathuvagnani Vethathiri Maharishi
8) Sound Health through Yoga - Dr.K. Chandrasekaran,
   Prem Kalyana Publications, Sedapatti
9) Light on Yoga - BKS. Iyenger, HarperCollins Publishers,
   New Delhi.
10) Yoga for Youth Empowerment - VISION for Wisdom