B.Sc. (Agriculture/Horticulture)

SYLLABI

2017-2018 (onwards)
### I semester

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course code</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>AGR 110</td>
<td>Principles of Agronomy and Agricultural Heritage</td>
<td>2+1</td>
</tr>
<tr>
<td>2.</td>
<td>AGR 111</td>
<td>Fundamentals of Agricultural Meteorology</td>
<td>1+1</td>
</tr>
<tr>
<td>3.</td>
<td>SAC 112</td>
<td>Principles of Analytical Chemistry</td>
<td>1+1</td>
</tr>
<tr>
<td>4.</td>
<td>GPB 113</td>
<td>Fundamentals of Plant Physiology</td>
<td>2+1</td>
</tr>
<tr>
<td>5.</td>
<td>TAM 114</td>
<td>ஆரம்ப தேவைவியலிய நூற்றாண்டுவழி கட்டுறச் சான்று நுழைவு நிறுவனம் பயணம் (OR) Development Education</td>
<td>0+1</td>
</tr>
<tr>
<td>6.</td>
<td>ENG 115</td>
<td>English for effective Communication</td>
<td>0+1</td>
</tr>
<tr>
<td>7.</td>
<td>PED 116</td>
<td>Physical Education</td>
<td>0+1</td>
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<tr>
<td>8.</td>
<td>PED 117</td>
<td>Principles and practices of Yoga</td>
<td>0+1</td>
</tr>
<tr>
<td>9.</td>
<td>NSS/NCC 118</td>
<td>National Service Scheme / National Cadet Corps</td>
<td>0+1</td>
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</tbody>
</table>

**Total 6+9=15**

### HORTICULTURE

#### B.Sc.(Hort.) -- Semester-wise Course Distribution

<table>
<thead>
<tr>
<th>S.No.</th>
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<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>HOR 110</td>
<td>Fundamentals of Horticulture</td>
<td>2+1</td>
</tr>
<tr>
<td>02.</td>
<td>AGR 111*</td>
<td>Fundamentals of Agricultural Meteorology</td>
<td>1+1</td>
</tr>
<tr>
<td>03.</td>
<td>SAC 112*</td>
<td>Principles of Analytical Chemistry</td>
<td>1+1</td>
</tr>
<tr>
<td>04.</td>
<td>GBP 113*</td>
<td>Fundamentals of Plant Physiology</td>
<td>2+1</td>
</tr>
<tr>
<td>05.</td>
<td>TAM 114* or ENG 114</td>
<td>ஆரம்ப தேவைவியலிய நூற்றாண்டுவழி கட்டுறச் சான்று நுழைவு நிறுவனம் பயணம் (OR) Development Education</td>
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</tr>
<tr>
<td>10.</td>
<td>HOR 119</td>
<td>Plant Propagation and Nursery Management</td>
<td>1+1</td>
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</tbody>
</table>

**Total 7+10 =17**
OBJECTIVES

Principles of Agronomy and Agricultural Heritage deal with principles and practices of crop production. To learn about the history of agriculture and agricultural development from ancient to modern age.

THEORY

Unit – I : Introduction to Agriculture

Unit – II: History of Agriculture Development

Unit – III : Crop Classification and Crop Production

Unit – IV: Basic Agricultural Operations

Unit – V : Harvesting and Storage
Maturity symptoms of field crops – methods of harvesting – Cleaning and drying - methods of storage.

PRACTICAL

THEORY LECTURE SCHEDULE

1. Agriculture – Definition –Agriculture as Art, science and Business
2. Importance and scope of agriculture in India and Tamilnadu
3. Branches of agriculture
4. Agronomy – definition – meaning and scope
5. National and International Agricultural Research Institutes in India
6. Indian agriculture- Indian economy – National income– Agricultural income in GDP
7. Women in agriculture and empowerment
8. History of agricultural development in the world and India
9. Agricultural heritage – Agriculture in ancient India and Evolution of man
10. Development of scientific agriculture
11. Stages of agriculture development - Era of civilization
12. Importance of Neolithic civilization
13. Chronological agricultural technology development in India
14. Kautilya’s Arthasasthra - Sangam literature
15. Tamil Almanac and rainfall prediction - ITK
16. Agronomic classification of crops
17. Economic and agricultural importance of crops in Tamil Nadu and India
18. Mid-semester Examination
19. Major crops of India and Tamil Nadu
20. Major soils of India and Tamil Nadu
22. Tillage – Definition – objectives -Types of tillage
23. Field preparation - Modern concepts of tillage
24. Seeds - Seed rate – Seed treatment- Different methods of sowing
25. Germination –Factors affecting germination
27. Inter cultivation - Thinning - gap filling and other intercultural operations
28. Weeds – Definition –beneficial and harmful effects of weeds
29. Irrigation and its impact on plant growth
30. Role of manures and fertilizers in crop production
31. Method of fertilizer application – slow release nutrients
32. Ways to improve FUE and concepts of INM
33. Maturity symptoms of field crops and methods of harvesting
34. Cleaning, drying and storage of field crops

PRACTICAL SCHEDULE
1. Visit to college farm to observe wet land, garden land and dry land farming systems
2. Identification of principle crops and seeds
3. Identification of manures and fertilizers
4. Identification of agrochemicals and their usage
5. Identification of green manures and green leaf manures and practicing incorporation methods
6. Identification of tools and implements-Acquiring skill in handling these implements
7. Identification of secondary tillage implements-Acquiring skill in handling these implements
8. Study of labour saving and special purpose implements
9. Practicing different methods of Seed treatments -Nursery preparation
10. Study on different methods of sowing and practicing seeding implements
11. Practicing application methods of manures and fertilizers
12. Acquiring skill in foliar fertilization
13. Calculation on plant population and working out seed rates
14. Practicing thinning, gap filling operations and intercultural operations
15. Working out fertilizer requirement of crops
16. Maturity symptoms and harvesting methods.
17. Orientation for final examination

REFERENCE BOOKS
OBJECTIVES
This course is scheduled to study the problems of plant growth and yield in relation to environmental factors. Agricultural Meteorology is mainly concerned with microclimatology in which the influence of the shallow layer of atmosphere immediately above the surface is studied.

THEORY
Unit -I: Introduction to Meteorology
Meteorology - Importance and scope in crop production – List of extreme points with the 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.

Unit -II: Solar radiation and temperature

Unit- III : Atmospheric pressure
Atmospheric pressure - cyclones, anticyclones, tornado, hurricane and storms – swinging of pressure belt - EL Nino and La Nino - definition and causes. Wind and its effect on crops.

Unit -IV: Clouds and Precipitation

Unit -V: Agro climatic zones and weather forecasting
Agroclimatic Zones of India and Tamil Nadu – Agroclimatic normals – Basics of weather forecasting –importance, synoptic chart - crop weather calendar - Remote sensing - Impact of climate and weather on crop production - pest and diseases.

PRACTICAL
Agromet Observatory - Site selection and layout. Acquiring skill in the use of different instruments and recording data on rainfall / precipitation temperature, pressure, humidity, wind direction and velocity, solar radiation, sunshine hours, evaporation, evapotranspiration, Lysimeters - Automatic weather station - Preparation of synoptic charts and crop weather calendars -Mapping of Agro climatic Zones.

THEORY LECTURE SCHEDULE
1. Meteorology - - Definition, their importance and scope in crop production.
2. Extreme points / Coordinates of India and Tamil Nadu. Atmosphere - Composition of atmosphere - Vertical layers of atmosphere based on temperature difference / lapse rate.
3. Climate and weather - Factors affecting climate and weather. Macroclimate - Mesoclimate - Microclimate - Definition and their importance
8. Atmospheric pressure, diurnal and seasonal variation - causes for variation - Isobar - Low, depression, anticyclone, Tornado, hurricane.
9. Mid Semester Examination
11. Evaporation - Transpiration, evapotranspiration - Potential evapotranspiration / references crop ET₀ - Definition and their importance in agricultural production.
12. Weather forecasting / Warming - Types, importance, Agro Advisory Services, Agromet services for India
13. Agro climatic zones of Tamil Nadu - Agro climatic normals for field crops.
14. Synoptic chart
15. Crop weather calendar.
17. Effect of weather and climate on crop production, soil fertility and incidence of pest and diseases.

PRACTICAL SCHEDULE
1. Site selection and layout for Agromet Observatory - Calculation of local time - Time of observation of different weather elements.
2. An introduction to Annamalai University Meteorological Observatory - AWS
3. Measurement of air, soil temperature and grass minimum temperature and study of thermo hygrograph
4. Measurement of solar radiation and sunshine hours
5. Humidity measurements – use of wet and dry bulb, Assmann psychrometer
6. Measurement of wind direction and wind speed
7. Measurement of rainfall - Ordinary and self-recording rain gauges
9. Measurement of atmospheric pressure - barograph
10. Measurement of Evaporation - Open pan evaporimeter- application of evaporation data-
11. Study of Automatic weather station
12. Data analysis for rainfall chart and thermo hygrograph chart data
13. Analysis of weather data – Mean, monthly, annual and diurnal variation of weather variables.
14. Preparation of crop weather calendars and forecast based agro advisories
15. Preparation of Synoptic charts
17. Orientation for final examination

REFERENCE BOOKS

e-resource

SAC 112 PRINCIPLES OF ANALYTICAL CHEMISTRY (1 +1)

OBJECTIVES
This course aims to familiarize students with the basic principles of Analytical Chemistry and instrumentation techniques. The principles and applications of sampling and separation techniques, titrimetric analysis, UV-visible and spectrophotometry, gravimetric analysis and electrochemical methods are emphasized.

THEORY
Unit I: Analytical Principles
General principles of analytical chemistry – common analytical methods – qualitative and quantitative analysis – accuracy and precision of analytical results - Preparation of laboratory reagents.
Unit II: Standards and Indicators
Unit III: Gravimetric Analysis
Unit IV: Instrumentation
Instrumental analysis – principles and practices of potentiometry, conductometry, colorimetry, spectrophotometry, absorption and emission spectroscopy and chromatography – choice of analytical methods.
Unit V: Radiation Chemistry

PRACTICAL
Analytical techniques and concepts – Gravimetry – Volumetry– Acidimetry - Alkalimetry– Permanganimetry – Dichrometry – Iodimetry, Complexometry -

THEORY LECTURE SCHEDULE
1. General principles in analytical chemistry – common analytical methods – quantitative and qualitative analysis –Accuracy and precision of analytical results.
2. Preparation of laboratory reagents – digestion and distillation techniques.
9. Mid Semester Examination.
11. Instrumental methods of analysis- Principles and practices of potentiometry, conductometry, colorimetry and spectrophotometry.
12. Principles and practices of absorption and emission spectroscopy-ICPA
13. Principles and practices of chromatography – Paper chromatography, Gas Chromatography, TLC, HPLC and HPTLC.
17. Use of radioactive and stable isotopes in analytical applications.

PRACTICAL SCHEDULE
1. Study of common laboratory glassware and apparatus – General Guidelines in the laboratory- Part - I
2. Volumetric analysis – Preparation of primary , secondary standards and indicators
3. Acidimetry – Standardization of bases
4. Alkalimetry – Standardization of acids
5. Permanganimetry – Standardization of KMnO4
6. Dichrometry - Standardization of Ferrous Sulphate
7. Iodimetry - Estimation of Copper
8. Complexometry - Estimation of Calcium and Magnesium
10. Potentiometry and Conductometry - Determination of pH and EC
11. Spectrophotometry - Determination of phosphorus
12. Turbidimetry - Estimation of Sulphur
13. Flame Photometry - Estimation of Potassium
14. Absorption spectrophotometry - Estimation of Fe / Zn / Mn / Cu
15. Identification of sub atomic particles, calculation of Half life and Activity Constant
16. Identification of types of radioactive decay
17. Orientation for final examination

REFERENCE BOOKS
GPB 113 FUNDAMENTALS OF PLANT PHYSIOLOGY (2+1)

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

THEORY
Unit І: Plant Water Relations

Unit ІІ: 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 ІІІ: Photosynthesis and Respiration

Unit ІV: Growth and Development

Unit V: Stress Physiology
PRACTICAL

THEORY LECTURE SCHEDULE
1. Importance of Crop Physiology in Agriculture – Structure of plasma membrane, chloroplast, mitochondria, peroxisome and vacuole
2. Structure and role of water - water potential and its components - Diffusion – Osmosis – 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
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
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
18. 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

PRACTICAL 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. Orientation for final examination

REFERENCE BOOKS

e-references
3. http://4e.plantphys.net
4. www.plantphysiol.org
10. பிளக்கண்டை தகுதியும் பெண் வைத்தும் - சுருக்கம் புதுவைகள் - பிளக்கண்டை பொறுப்புகள் - தட்டு வில்லியம் - வாக்கால் வழிபாடு - பிளக்க்ககன் திறக்கும்
11. நூற்றாண்டிற்கு முதல் பிளக்கண்டைகள் - மனிதன் மன்னர்களும் - கால் பிளக்கண்டைகள்
12. மேலும் செய்யப்பட்ட புனித கேள்விகள் - சேச்சி ச. காந்தியீரமைகள் வாக்காலம்
13. மூன்றாம் கட்டுமான நாளில் விழாவில் விளக்கத்திற்கு, பிளக்கண்டை வழிபாடுகள், பிளக்கண்டை விளக்கம்
14. கிளையன்பதிவுகள் - பிளக்கண்டை கட்டுமான செய்திகள் மற்றும் புதிய நாள்கள் - பிளக்கண்டைப்
பிளக்கண்டை கட்டுமான செய்திகள், மற்றும் புதிய நாள்கள் - பிளக்கண்டை
15. பிளக்கண்டை செய்திகள் - புது குழுவுகள் - பிளக்கண்டை வழிபாடுகள் - பிளக்கண்டை வழிபாடுகள்
16. பிளக்கண்டை வழிபாடுகளுக்கு அடுக்கும் அளவாக்ககள் - மேலும் தடுக்கப்பட்ட எடுக்கும்
பிளக்கண்டை வழிபாடுகள்
17. வணக்கத்துக்கு கலந்து - குறிப்பிட்டது பதிவுகளில் - மண்டலம் புகிய - பிளக்கண்டை புகிய
பிளக்கண்டை வழிபாடுகள் - பிளக்கண்டை வழிபாட்டின் முக்கியத்துவம் மற்றும் பெருநூற்றாண்டு வாக்காலம்

முன்மொழிகள் வழிபாடுகள்

• குன்றாலி தூரவிட்டு பிளக்கண்டைகள் பபீர், குர்மினா பிளக்கண்டைகள் பபீர்ச்சூரில், மாநிலப்புகழ், 1974
• குன்றாலி, சிற்று பிளக்கண்டைகள் பிளக்கண்டைகள் பபீர், குர்மினா பிளக்கண்டைகள் பபீர்ச்சூரில், மாநிலப்புகழ், 1981.
• குன்றாலி, சிற்று. பிளக்கண்டைகளை பிளக்கண்டைகள், காலம் முன்மொழிகள் பபீர்ச்சூரில், மாநிலப்புகழ் 1983.
• பிளாக்றுறுகிரார்பா இ.ஈ. ஆயினை விளக்கும், பெண், பிளாக்றுறுகிரார்பா விளக்கும் பிளாக்றுறுகிரார்பா, பெண், பிளாக்றுறுகிரார்பா, இணைய விளக்கம், 2002
• பிளாக்றுறுகிரார்பாவின் விளக்கும் குறிப்பிட்டு பிளாக்றுறுகிரார்பா உத்தரங்கள் விளக்கும், பெண், பிளாக்றுறுகிரார்பா, இணைய விளக்கம், 2002
• பிளாக்றுறுகிரார்பா பிளாக்றுறுகிரார்பா, பிளாக்றுறுகிரார்பா உத்தரங்கள் விளக்கும், பெண், பிளாக்றுறுகிரார்பா, 2006
• பிளாக்றுறுகிரார்பா, பிளாக்றுறுகிரார்பா, பிளாக்றுறுகிரார்பா இணைய விளக்கம், 2008
• சுகோணமுத்திரா பிளாக்றுறுகிரார்பா, பிளாக்றுறுகிரார்பா - பிளாக்றுறுகிரார்பா வழிபாடு
• பிளாக்றுறுகிரார்பா குறிப்பிட்டு பிளாக்றுறுகிரார்பா வழிபாடுகள், குறிப்பிட்டு பிளாக்றுறுகிரார்பா வழிபாடு
• பிளாக்றுறுகிரார்பா பிளாக்றுறுகிரார்பா, குறிப்பிட்டு பிளாக்றுறுகிரார்பா வழிபாடு
• பிளாக்றுறுகிரார்பா, பிளாக்றுறுகிரார்பா - பிளாக்றுறுகிரார்பா வழிபாடுகள், குறிப்பிட்டு பிளாக்றுறுகிரார்பா வழிபாடு
ENG 114 DEVELOPMENT EDUCATION (0+1)
(Alternate courses for non-Tamil students)

OBJECTIVES
- 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. Orientation for final examination

REFERENCE BOOKS
OBJECTIVES
To make the students competent in Listening – Receptive skill, Speaking – Productive skill, Reading – Receptive skill and Writing – Productive skill

Unit I - LISTENING
Introduction - Listening vs Hearing - Basic listening modes - Types of listening - Intensive and Extensive Listening - Process of Listening - Methods of enhancing listening - Barriers of listening.

Unit II - SPEAKING

Unit III - READING
Introduction to Reading - Types of reading - Skimming and Scanning - Idea reading (Reading for information) - Exploratory reading - Study reading (Text reading) - Critical reading - Analytical reading - Note-making - Précis Writing.

Unit IV - WRITING
Word formation (prefix, suffix and word coining) - Word expansion (root word and etymology) - Compound words - Single word substitutes - Abbreviations and acronyms - Sentence agreement - Sentence completion - Sentence correction - Writing definitions - Coherence and cohesion in writing - Mind mapping in writing - Paragraph writing techniques - Thesis sentence writing - Inferential sentence writing - Logical arrangement of sentences - Letter Writing - Text conversion - Interpreting charts, graphs, diagrams into text - Poster making - Essay writing (types of essays).

Unit V
Integrated skills - Group Discussion - Presentation (Seminar) - Forum discussion - Brain Storming – Debate – Writing Fan-mail – e-mail.

PRACTICAL SCHEDULE
1. Introduction - Listening vs Hearing - Listening modes - Types of listening - Intensive and Extensive Listening
2. Process of Listening - Methods of enhancing listening
3. Barriers of listening - Note-taking
4. English Phonology - Influence of Language 1 on Language 2
5. English Stress and Intonation
6. Principles of speech preparation
7. Presentation skills
8. Techniques of speaking
9. Mid semester examination
10. Introduction to reading - Types - Scanning and Skimming - Idea reading (Reading for information) - Exploratory reading - Study reading (Text reading) - Critical reading - Analytical reading - Note-making - Précis Writing.
11. Word formation (prefix, suffix and word coining) - Word expansion (root word and etymology) - Compound words - Single word substitute - Abbreviations and Acronyms
12. Sentence agreement - Sentence completion - Sentence correction - Writing definitions
13. Writing Practice - Mind mapping - Sentence writing - Logical arrangement of sentences
14. Paragraph writing - Techniques - Thesis sentence writing - Inferential sentence writing - Coherence and cohesion in writing
15. Letter Writing - Types of letters
16. Text conversion - Interpreting charts, graphs, diagrams into text - Poster making - Essay writing (types of essays)
17. Orientation for final examination
REFERENCE BOOKS
3. Helgesen, Mark et al., Active listening, 1997, Cambridge University
8. Robert, A. Day How to Publish a Scientific Article 2001, Oxford University
15. Team of authors - Cambridge IELTS Books 1 to 5, 2006, Cambridge University.
17. Team of authors - TOEFL ibt-2007-Barron.

e-references
1. www esl--lab.com 2. www.webenglishteacher.com

PED 116 PHYSICAL EDUCATION (0+1)

OBJECTIVES

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, flaying 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, fick 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.

PED 117 PRINCIPLES AND PRACTICES OF YOGA (0 + 1)

OBJECTIVES
To inculcate the basics of yoga for the rejuvenation of body, mind and intellect.

PRINCIPLES (20 hrs)

UNIT I
Introduction to yoga: The origins of yoga – Definitions – concepts – Aims and objectives of yoga – Five principles of yoga – yoga Diet – Classification of Diet

UNIT II
Streams of yoga: Karma yoga – Bhakti yoga – Jnana yoga – Raja yoga (Astanga yoga)

UNIT III

UNIT IV
Scientific effects: Physiological, Psychological, Biochemical effects on various systems of human body: Asana – Pranayama – Mudra - Bandha and Shat Kriya

UNIT V

Meditation and relaxation techniques: Meditation: Introduction – Meaning – Definition - Techniques –Obstacles – Benefits ; Relaxation techniques: IRT – QRT – DRT – Psychic sleep

PRACTICAL SCHEDULE (40 hrs)
1. Prayer - Starting and closing
2. Breathing practices for awareness : Hands in and out breathing,-Hand stretch breathing- Ankle breathing
3. Preparatory practices: Loosening practices- Forward and backward bending – Lateral bending-Alternate toe touching-spinal twisting; Jogging-Forward-Backward and Sideward
4. Suryanamaskar – Start with prayer/mantra – 12 poses
5. Asana: Standing –Periyaasana, Padhastasana, Trikonasana; Siting – Vajrasana,Paschimotasana, Ushtrasana, Vakrasana; Prone – Makrasana; Bhujangasana, Shalabasana, Dhanurasana; Supine – Uttanapadasana, Sarvangasana, Matyasana, Halasana, Chakrasana, Savasana
7. Mudra – Chin mudra, Chinmaya mudra, Adhi mudra, Brahma mudra, Namaskara mudra, Maha mudra, Vishnu mudra/Nasiga mudra, Yoga mudra
8. Bandha - Jalandra Bandha, Uddiyana Bandha, Moola Bandha
9. Kriya - Kapala pathi, Trataka-Jothi trataka, Jatri trataka; Neti-Jala neti, Sutra neti; Dhouti –Vamana dhouti
10. Dhayana practice – Meditation
11. Relaxation –Instant relaxation technique (IRT); Quick relaxation technique (QRT); Deep relaxation technique (DRT)
12. Practical record preparation

REFERENCE BOOKS
2. Shivananda Saraswati, Yoga Therapy, Bihar School of yoga, Munger,1998
3. Swami Satyananda Saraswati, Asana, Pranayama, Mudra and Bandha, Bihar School of Yoga , Munger, 2002
5. Hatha yoga Pradipika, Swami Satyananda Saraswati, Bihar School of Yoga , Munger, 2004

NSS/NCC  118 NATIONAL SERVICE SCHEME/NATIONAL CADET CORPS

NATIONAL SERVICE SCHEME (NSS)

PRACTICAL SCHEDULE
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 – 17: Campus development, tree planting maintenance and greening the campus cleaning.

NATIONAL CADET CORPS (NCC)


PRACTICAL SCHEDULE

1. NCC song – Aims and Motto of NCC – Motivation of cadets
2. History of NCC and organization of NCC
3. Food drill – General and word of Command
5. National Integration – Indian History and Culture
6. Health and Hygiene – Structure and Function of a human body, hygiene and Sanitation
7. Social Service – weaker sections of our society and their needs
8. Self Defence – Theory and practice, prevention of untoward incidence
9. Map reading – introduction to map, and lay out of map
10. Disaster Management Civil defence organization and its duties
11. Communication – Different types – media
12. Signals – introduction to radio, telephony procedures
13. Field Engineering – principles and applications, camouflage and concealment
14. Adventure training introduction, different types
15. First Aid – methods and practices
17. Besides the above schedule, NCC cadets will be involved during important occasions during convocation, Independence day, Republic day, etc.
HORTICULTURE
Objectives
To impart the basic knowledge in horticulture and serve as a platform over which advanced technologies of horticulture can be built up.

Theory
Unit–I: Scope and Importance of Horticulture

Unit–II: Establishment of Orchard and Production Techniques, Factors Influencing Crop Production

Unit–III: Nursery Management and Cropping System

Unit–IV: Growth and Development

Unit–V: Protected Cultivation and Post-Harvest Technology

Practical

Lecture Schedule
1. Scope, importance and nutritive value of horticultural crops.
2. Divisions of horticulture.
3. Area and production of horticultural crops.
4. Export and import of horticulture crops and their products – global scenario.
5. Classification of horticulture crops.
6. Different climate zones of India and Tamil Nadu in relation to horticulture crops.
8. Different planting systems.
9. Nutrition garden, kitchen garden and other types of garden.
10. Soil and climate factors in relation to horticulture crop production.
11. Factors limiting horticulture crop production.
12. Fertility management in orchards.
15. Study of cropping systems.
17. Mid Semester Examination
19. Principles of organic farming
20. Bearing habits of horticulture crops.
21. Study of flowering, pollination and fruit set in horticulture crops.
22. Fruitfulness – causes and prevention in horticulture crops.
23. Fruit drop – causes and prevention in horticulture crops.
27. Role of growth regulators in horticultural crops.
28. Principles and practices of protected cultivation.
29. Study of different types of media and protected structures for propagation.
30. Study of green house components
31. Environmental control for crop production.
32. Post-harvest technology – importance and causes for post-harvest losses.
33. Maturity indices – climacteric and non climacteric fruits.
34. Harvesting methods.

Practical Schedule
1. Study of different features of orchard.
2. Planning, layout and planting of fruit trees.
3. Identification of tools and implements.
4. Preparation of nursery beds and sowing vegetable seeds and transplanting of vegetable crops.
5. Practicing training of fruit trees.
6. Practicing pruning of fruit trees.
7. Identification of growth regulators and preparation and application.
8. Preparation of fertilizer mixtures and field application.
9. Practicing weeding including chemical weed control.
10. Layout of different irrigation systems and irrigation methods.
11. Study of bearing habits of horticultural crops.
12. Study of different structures for protected cultivation.
13. Study of different media for protected cultivation.
14. Practice in judging the maturity indices of fruits and vegetables.
15. Study of harvesting methods.
16. Visit to green houses.
17. Orientation for final practical examination.

References
AGR 111 – FUNDAMENTALS OF AGRICULTURAL METEOROLOGY (1+1)

OBJECTIVES
This course is scheduled to study the problems of plant growth and yield in relation to environmental factors. Agricultural Meteorology is mainly concerned with microclimatology in which the influence of the shallow layer of atmosphere immediately above the surface is studied.

THEORY
Unit -I: Introduction to Meteorology
Meteorology - Importance and scope in crop production – List of extreme points with the 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 .

Unit -II: Solar radiation and temperature

Unit- III: Atmospheric pressure
Atmospheric pressure - cyclones, anticyclones, tornado, hurricane and storms – swinging of pressure belt - EL Nino and La Nino - definition and causes. Wind and its effect on crops.

Unit -IV: Clouds and Precipitation

Unit -V: Agro climatic zones and weather forecasting
Agroclimatic Zones of India and Tamil Nadu – Agroclimatic normals – Basics of weather forecasting –importance, synoptic chart - crop weather calendar - Remote sensing - Impact of climate and weather on crop production - pest and diseases.

PRACTICAL
Agromet Observatory - Site selection and layout. Acquiring skill in the use of different instruments and recording data on rainfall / precipitation temperature, pressure, humidity, wind direction and velocity, solar radiation, sunshine hours, evaporation, evapotranspiration, Lysimeters - Automatic weather station - Preparation of synoptic charts and crop weather calendars -Mapping of Agro climatic Zones.

THEORY - LECTURE SCHEDULE
18. Meteorology - - Definition, their importance and scope in crop production.
20. Climate and weather - Factors affecting climate and weather. Macroclimate - Mesoclimate - Microclimate - Definition and their importance

25. Atmospheric pressure, diurnal and seasonal variation - causes for variation - Isobar - Low, depression, anticyclone, Tornado, hurricane.

26. Mid Semester Examination


28. Evaporation - Transpiration, evapotranspiration - Potential evapotranspiration / references crop ET, - Definition and their importance in agricultural production.

29. Weather forecasting / Warming - Types, importance, Agro Advisory Services, Agromet services for India

30. Agro climatic zones of Tamil Nadu - Agro climatic normals for field crops.

31. Synoptic chart

32. Crop weather calendar.

33. Remote sensing and its application on crop production.

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

PRACTICAL SCHEDULE

18. Site selection and layout for Agromet Observatory - Calculation of local time - Time of observation of different weather elements.

19. An introduction to Annamalai University Meteorological Observatory - AWS

20. Measurement of air, soil temperature and grass minimum temperature and study of thermo hygrograph

21. Measurement of solar radiation and sunshine hours

22. Humidity measurements – use of wet and dry bulb, Assmann psychrometer

23. Measurement of wind direction and wind speed

24. Measurement of rainfall - Ordinary and self-recording rain gauges


26. Measurement of atmospheric pressure - barograph

27. Measurement of Evaporation - Open pan evaporimeter- application of evaporation data-

28. Study of Automatic weather station

29. Data analysis for rainfall chart and thermo hygrograph chart data

30. Analysis of weather data – Mean, monthly, annual and diurnal variation of weather variables.

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

32. Preparation of Synoptic charts

33. Mapping of agro climatic Zones of India and Tamil Nadu and its characterization.

34. Orientation for final examination

REFERENCE BOOKS


OBJECTIVES: This course aims to familiarize students with the basic principles of Analytical Chemistry and instrumentation techniques. The principles and applications of sampling and separation techniques, titrimetric analysis, UV-visible and spectrophotometry, gravimetric analysis and electrochemical methods are emphasized.

THEORY

Unit I: Analytical Principles

General principles of analytical chemistry – common analytical methods – qualitative and quantitative analysis – accuracy and precision of analytical results - Preparation of laboratory reagents.

Unit II: Standards and Indicators


Unit III: Gravimetric Analysis


Unit IV: Instrumentation

Instrumental analysis – principles and practices of potentiometry, conductometry, colorimetry, spectrophotometry, absorption and emission spectroscopy and chromatography – choice of analytical methods.

Unit V: Radiation Chemistry


PRACTICAL


THEORY SCHEDULE

18. General principles in analytical chemistry – common analytical methods – quantitative and qualitative analysis – Accuracy and precision of analytical results.

19. Preparation of laboratory reagents – digestion and distillation techniques.


26. Mid Semester Examination.

27. Filtration and choice of filters – washing – washing solutions and washing technique.

28. Instrumental methods of analysis– Principles and practices of potentiometry, conductometry, colorimetry and spectrophotometry.
29. Principles and practices of absorption and emission spectroscopy - ICPA
30. Principles and practices of chromatography – Paper chromatography, Gas Chromatography, TLC, HPLC and HPTLC.
33. Stable isotopes – Mass spectroscopic measurements and their application in agricultural research.
34. Use of radioactive and stable isotopes in analytical applications.

PRACTICAL SCHEDULE
17. Study of common laboratory glassware and apparatus – General Guidelines in the laboratory- Part - I
18. Volumetric analysis – Preparation of primary, secondary standards and indicators
19. Acidimetry – Standardization of bases
20. Alkalimetry – Standardization of acids
21. Permanganimetry – Standardization of KMnO₄
22. Dichrometry – Standardization of Ferrous Sulphate
23. Iodimetry – Estimation of Copper
24. Complexometry – Estimation of Calcium and Magnesium
25. Principles of Gravimetry – Moisture Estimation
26. Potentiometry and Conductometry - Determination of pH and EC
27. Spectrophotometry – Determination of phosphorus
28. Turbidimetry – Estimation of Sulphur
29. Flame Photometry – Estimation of Potassium
30. Absorption spectrophotometry – Estimation of Fe / Zn / Mn / Cu
31. Identification of sub atomic particles, calculation of Half life and Activity Constant
32. Identification of types of radioactive decay
17. Orientation for final examination

REFERENCE BOOKS

e-references

GPB 113 FUNDAMENTALS OF PLANT PHYSIOLOGY (2+1)

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

THEORY
Unit I: Plant Water Relations
Importance of Crop Physiology in Agriculture – cell organelle - plasma membrane, chloroplast, mitochondria, peroxisome and vacuole - Structure and role of

Unit II: Plant Mineral Nutrition

Unit III: Photosynthesis and Respiration

Unit IV: Growth and Development

Unit V: Stress Physiology

PRACTICALS

THEORY LECTURE SCHEDULE
35. Importance of Crop Physiology in Agriculture – Structure of plasma membrane, chloroplast, mitochondria, peroxisome and vacuole
37. Mechanisms of water absorption – Pathways of water movement – Apoplast and symplast
38. Translocation of water – ascent of sap – mechanisms of xylem transport
40. Mineral nutrition – criteria of essentiality - classification of nutrients – macro, micro, mobile and immobile – mechanism of nutrient uptake
41. Physiological functions and disorders of macro nutrients – Hidden hunger
42. Physiological functions and disorders of micro nutrients
43. Foliar nutrition- root feeding and fertigation – sand culture, hydroponics and aeroponics
44. Light reaction – photolysis of water and photophosphorylation
45. Photosynthetic pathways – $C_3$ and $C_4$ cycles
46. CAM pathway – difference between three pathways - Factors affecting photosynthesis.
47. Photorespiration – pathway and its significance
48. Phloem transport – Munch hypothesis - Phloem loading and unloading - Source and sink strength and their manipulations
49. Glycolysis – TCA cycle
50. Oxidative phosphorylation – difference between photo and oxidative phosphorylation – energy budgeting - respiratory quotient
52. Mid Semester Examination
53. Biosynthetic pathway and role of auxins
54. Biosynthetic pathway and role of gibberellins and cytokinin
55. Biosynthetic pathway and role of ethylene and ABA
56. Novel growth regulators – Brassinosteroids and salicylic acid – New Generation PGR’s
57. Growth retardants and inhibitors -commercial uses of PGR’s
58. Photoperiodism - short, long and day neutral plants – Chailakhyan’s theory of flowering
59. Forms of phytochrome - Pr and Pfr - regulation of flowering
60. Vernalisation - theories of vernalisation – Lysenko and Chailakhyan’s theories
61. Seed germination - physiological and biochemical changes - seed dormancy and breaking methods
62. Senescence and abscission – physiological and biochemical changes
63. Physiology of fruit ripening- climacteric and non climacteric fruits - factors affecting ripening and manipulations
64. Drought – physiological changes - adaptation – compatible osmolytes - alleviation
65. High and low temperature stress – physiological changes - membrane properties - adaptation
66. Salt stress – physiological changes - adaptation – compartmentalization - alleviation
67. Flooding and UV radiation stresses – physiological changes - adaptation
68. Global warming – green house gases —physiological effects on crop productivity- Carbon Sequestration

PRACTICAL SCHEDULE
18. Preparation of different types solutions
19. Measurement of plant water potential by different methods
20. Estimation of photosynthetic pigments- chlorophylls and Carotenoids
21. Determination of stomatal index and stomatal frequency
22. Measurement of leaf area by different methods
23. Physiological and Nutritional disorders in crops plants
24. Estimation of chlorophyll Stability Index
25. Estimation of Relative Water Content
26. Determination of photosynthetic efficiency in crop plants – soluble protein
27. Estimation of Nitrate Reductase activity
28. Growth Analysis - LAI, LAD, SLA, SLW, LAR, NAR, RGR, CGR and HI
29. Bioassay of Cytokinin
30. Bioassay of GA
31. Estimation of proline
32. Demonstration of Practical applications of PGRs.
33. Field visit for foliar diagnosis
34. Orientation for final examination

REFERENCE BOOKS


E-books and e-references

7. http://4e.plantphys.net
8. www.plantphysiol.org
ENG. 114 DEVELOPMENT EDUCATION (0+1)
(Alternate courses for non-Tamil students)

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

LECTURE SCHEDULE
19. Occupation and profession, training and education, lateral thinking and convergent thinking, teaching and learning – discussion.
20. Bloom's classification of educational objectives – Cognitive, Affective, Psychomotor domain(s)
21. Career development – opportunity for graduates of agriculture and allied sciences – discussion
22. Success story of a farmer / entrepreneur – factors involved – role – play
23. Brainstorming – Demonstration
25. Interpersonal communication – Transactional communication – ice breaker
26. Mid semester examination
27. The conduct of a symposium
28. Conferencing – the concept and presentation of a paper
29. Scientific Article Writing and Editing
30. Popular Article Writing, Editing and Blogging
31. Project proposal
32. Project Report – writing
34. Orientation for final examination

REFERENCE BOOKS
ENG 115 ENGLISH FOR EFFECTIVE COMMUNICATION     (0+1)

OBJECTIVES
To make the students competent in Listening – Receptive skill, Speaking – Productive skill, Reading – Receptive skill and Writing – Productive skill

Unit I - Listening
Introduction - Listening vs Hearing - Basic listening modes - Types of listening - Intensive and Extensive Listening - Process of Listening - Methods of enhancing listening - Barriers of listening.

Unit II - Speaking

Unit III - Reading
Introduction to Reading - Types of reading - Skimming and Scanning - Idea reading (Reading for information) - Exploratory reading - Study reading (Text reading) - Critical reading - Analytical reading - Note-making - Précis Writing.

Unit IV - Writing
Word formation (prefix, suffix and word coining) - Word expansion (root word and etymology) - Compound words - Single word substitutes - Abbreviations and acronyms - Sentence agreement - Sentence completion - Sentence correction - Writing definitions - Coherence and cohesion in writing - Mind mapping in writing - Paragraph writing techniques - Thesis sentence writing - Inferential sentence writing - Logical arrangement of sentences - Letter Writing - Text conversion - Interpreting charts, graphs, diagrams into text - Poster making - Essay writing (types of essays).

Unit V
Integrated skills - Group Discussion - Presentation (Seminar) - Forum discussion - Brain Storming – Debate – Writing Fan-mail – e-mail.

The Practical Class Schedule for the revised English course is as follows:
18. Introduction - Listening vs Hearing - listening modes - Types of listening - Intensive and Extensive Listening
19. Process of Listening - methods of enhancing listening
20. Barriers of listening - Note-taking
21. English Phonology - Influence of Language 1 on Language 2
22. English Stress and Intonation
23. Principles of speech preparation
24. Presentation skills
25. Techniques of speaking
26. Mid semester examination
27. Introduction to reading - Types - Scanning and Skimming - Idea reading (Reading for information) - Exploratory reading - Study reading (Text reading) - Critical reading - Analytical reading - Note-making - Précis Writing.
28. Word formation (prefix, suffix and word coining) - Word expansion (root word and etymology) - Compound words - Single word substitute - Abbreviations and Acronyms
29. Sentence agreement - Sentence completion - Sentence correction - Writing definitions
30. Writing Practice - Mind mapping - Sentence writing - Logical arrangement of sentences
31. Paragraph writing - techniques - Thesis sentence writing - Inferential sentence writing - coherence and cohesion in writing
32. Letter Writing - Types of letters
33. Text conversion - Interpreting charts, graphs, diagrams into text - Poster making - Essay writing (types of essays)
34. Orientation for final examination

REFERENCE BOOKS
22. Helgesen, Mark et al., Active listening, 1997, Cambridge University
27. Robert, A. Day How to Publish a Scientific Article 2001, Oxford University
32. Team of authors - Read Better, Write Better 2005, Readers Digest.
33. Team of authors - Cambridge BEC Vantage, 2005, Cambridge University.
34. Team of authors - Objective IELTS, 2006, Intermediate and Advanced, Cambridge University.
35. Team of authors - TOEFL ibt-2007-Barron.

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42. www.teachersdesk.com
43. www.bogglesworld.com
44. www.flexiblelearning.net.an
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, forehand stroke, back hand stroke, lob, smash, volley, wall practice, spin service and defence tactics.
Football: 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 persue 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
(e) Sprint: Medium start, long start, bunch start, set, pick up, finish, upsweep, downsweep, placement, receiving and exchanging.
(f) Jumps: Western roll, belly roll, eastern cut off, fass ferry flop, approach, take off, straddle, hitch-kick, handging, clearance, landing, strides etc.
(g) 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, cross method pary obraine, discoput, rotation, carry and glide.
(h) 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.

PED 117 PRINCIPLES AND PRACTICES OF YOGA (0 + 1)

PRINCIPLES (20 hrs)
UNIT I
Introduction to yoga: The origins of yoga – Definitions – Concepts – Aims and objectives of yoga – Five principles of yoga – Yoga Diet – Classification of Diet

UNIT II
Streams of yoga: Karma yoga – Bhakti yoga – Jnana yoga – Raja yoga (Astanga yoga)

UNIT III

UNIT IV
Scientific effects: Physiological, Psychological, Biochemical effects on various systems of human body: Asana – Pranayama – Mudra – Bandha and Shat Kriya

UNIT V

PRACTICAL (40 hrs)
13. Prayer - Starting and closing
14. Breathing practices for awareness: Hands in and out breathing, Hand stretch breathing, Ankle breathing
16. Suryanamaskar – Start with prayer/mantra – 12 poses
17. Asana: Standing: -Periyaasana, Padhastasana, Trikonasana; Sitting – Vajrasana, Paschimotasana, Ushtrasana, Vakrasana; Prone – Makrasana; Bhujangasana, Shalabhasana, Dhanurasana; Supine – Uttanapadasana, Sarvangasana, Matyasana, Halasana, Chakrasana, Savasana
19. Mudra – Chin mudra, Chinmaya mudra, Adhi mudra, Brahma mudra, Namaskara mudra, Maha mudra, Vishnu mudra/Nasiga mudra, Yoga mudra
20. Bandha – Jalandra Bandha, Uddiyana Bandha, Moola Bandha
22. Dhayana practice – Meditation
23. Relaxation – Instant relaxation technique (IRT); Quick relaxation technique (QRT); Deep relaxation technique (DRT)
24. Practical record preparation

References
7. Shivananda Saraswati, Yoga Therapy, Bihar School of Yoga, Munger, 1998
8. Swami Satyananda Saraswati, Asana, Pranayama, Mudra and Bandha, Bihar School of Yoga, Munger, 2002
10. Hatha yoga Pradipika, Swami Satyananda Saraswati, Bihar School of Yoga, Munger, 2004

NSS/NCC 118 NATIONAL SERVICE SCHEME/NATIONAL CADET CORPS

NSS
PRACTICAL SCHEDULE
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 – 17: Campus development, tree planting maintenance and greening the campus cleaning.

NCC

PRACTICAL SCHEDULE
18. NCC song – Aims and Motto of NCC – Motivation of cadets
19. History of NCC and organization of NCC
20. Food drill – General and word of Command
22. National Integration – Indian History and Culture
23. Health and Hygiene – Structure and Function of a human body, hygiene and Sanitation
24. Social Service – weaker sections of our society and their needs
25. Self Defence – theory and practice, prevention of untoward incidence
26. Map reading – introduction to map, and lay out of map
27. Disaster Management Civil defence organization and its duties
28. Communication – Different types – media
29. Signals – introduction to radio, telephony procedures
30. Field Engineering – principles and applications, camouflage and concealment
31. Adventure training introduction, different types
32. First Aid – methods and practices
33. Environment and Ecology – conservation
34. Besides the above schedule, NCC cadets will be involved during important occasions during convocation, Independence day, Republic day, etc.

HOR 119 PLANT PROPAGATION AND NURSERY MANAGEMENT (1+1)
Objectives
Plant propagation is one of the fundamental agricultural operations which involves multiplication and perpetuation of seeds and planting material to achieve uniform stand of crops with high yield potential. This course deals with different methods of plant propagation and strategies for nursery management of various fruit crops. Knowledge of tools and implements is essential to carry out all scientific horticultural operations and also nursery management practices.

Theory
Unit–I: Methods of propagation
Scope and importance – propagation – overview – methods of sexual and asexual propagation – advantages and disadvantages of sexual and vegetative propagation.

Unit-II: Principles and methods of seed propagation


Unit-III: Propagation structures


Unit-IV: Asexual propagation techniques


Unit-V: Micro propagation


Practical


Lecture Schedule

1. Scope and importance of plant propagation, study of sexual and asexual methods of propagation.
2. Advantages and disadvantages of sexual and vegetative propagation.
3. Seed dormancy – Internal and external factors.
4. Nursery techniques, protract culture, apomixes, monoembryony and polyembryony.
5. Propagation structures - mistchambers, cold frames, hot beds, humidifiers.
6. Construction of green houses and glass houses and its controlling system.
7. Tools and implements.
8. Use of growth regulators in seed and vegetative propagation.
9. Mid Semester Examination
10. Types of cuttings and techniques of preparation.
11. Types of layering and techniques of preparation.
15. Propagation by specialized plant parts – bulbs and tubers.
16. Propagation by specialized plant parts – runners, suckers and other organs.
17. Micro propagation techniques

Practical Schedule

1. Preparation of nursery beds, seed treatment and sowing.
2. Identification of various tools and implements.
3. Preparation of pot mixture and study of various containers.
4. Practice in potting, repotting and liquid manures.
5. Study of special structures for propagation viz., mist chamber, cold frames, hot beds, poly house, shade net house.
7. Mist propagation techniques.
8. Practice in propagation by cuttings.
10. Practice in budding methods.
11. Practice in grafting methods.
12. Use of growth regulators in propagation.
13. Practices in separation and description of plant parts used for propagation.
14. Rejuvenation, top working and bridge grafting.
15. Practice in micro propagation and hardening methods.
16. Visit to tissue culture laboratory and controlled green houses and project preparation for commercial nurseries and visit to private nurseries.
17. Orientation for final practical examination.

References

Web resource
1. www.fruits.com