



VELS

UNIVERSITY



PALLAVARAM - CHENNAI - INDIA

VELS INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES (VISTAS)

(Deemed to be University Estd. u/s 3 of the UGC Act, 1956)

SCHOOL OF AGRICULTURE

DIPLOMA IN AGRICULTURE

Syllabus

2022

1. Title and Scope

- 1.1.** These academic Regulations shall be called “Vels Institute of Science Technology and Advanced Studies, School of Agriculture, Diploma in Agriculture (Dip. Agri) regulations for obtaining Diploma in Agriculture in the School of Agriculture.
- 1.2.** The regulations provided herein shall apply to the students admitted from the academic year 2022-23 onwards.

2. Definitions

- 2.1.** University: Vels Institute of Science Technology and Adanvanced Studies
- 2.2.** State Government: State Government means the Government of Tamilnadu.
- 2.3.** Academic year: An academic year is a period during which a cycle of study is completed. It shall commence on or after 1st July of each year. There shall be two semesters in an academic year.
- 2.4.** Semester: A semester shall consist of 105 working days inclusive of the mid-semester and practical examinations.
- 2.5.** Curriculum: It is a series of courses offered to provide learning opportunities to meet the requirements for a degree.
- 2.6.** Course: A course is a unit of instructions, series of classes and work experience extending over a semester. It has a specific Prefix, , code number, title and credits. Each course is denoted by specific code number, which has specific meaning.

The first three alphabets stand for the department offering the course. First digit is related to the year; second digit is related to the semester and the third digit is related to course number in a particular semester i.e. “SAC-114 “Soils and their management”. “SAC” stands for the Department of Soil Science and Agricultural chemistry; the first digit (1)stands for the year; second digit (1) stands for the semester and the third digit (2) stands for the serial number of course in a particular semester.
- 2.7.** Credit: It is a measure of quantity of work done in a course. One credit represents one contact hour for theory or two contact hours of laboratory or field work per week . For example, a 1+1 course (2 credits) means 1 hour theory and 2 hours practical per week.
- 2.8.** Credit load: It is the number of credits a student undergoes in a semester.
- 2.9.** Grade Point: “Grade Point” means the total marks in percentage divided by 10 and shall be expressed on 10-point scale upto second decimal place.

2.10. Credit point: A credit point is a product of grade point obtained by a student and number of credits in a course.

2.11. Grade Point Average (GPA): It is a measure of performance of a student in all the courses taken during a semester. The GPA is computed by dividing the total credit points earned by a student in a semester by the total number of credits taken during that semester.

2.12. Overall Grade Point Average (OGPA). It is a measure of the cumulative performance of a student on completion of the second and subsequent semesters of the degree programme. It is computed by dividing the total credit points earned by a student up to the end of a particular semester by the total number of credits. It shall be expressed on 10 point scale up to second decimal place

2.13. The OGPA shall be rounded off to second digit of decimal point on the basis of third digit. If third digit of decimal point is 5 or more than 5, then second digit will be increased by one. If, however, it is less than 5, it will be ignored. This will be done at the end of each semester while calculating the OGPA.

2.14. Calculation of OGPA

To arrive at the “Overall Grade Point Average (OGPA)” at the end of a semester, the grade point of each course is multiplied by the credit hours of the course to obtain the credit points. Then, the sum of the credit points secured by the student in all the courses taken till the end of that semester is divided by the total number of credit hours of the courses, provided that the credit hours and credit points of courses which are repeated are not counted more than once for this purpose.

For Example

i. Total credit hours till the end of last semester	18
ii. Total credit points till the end of last semester	: 140.50
iii. Total credit hours in the current semester	22
iv. Total credit points obtained in the current semester	156
v. Total credit hours including the current semester	: (18+22) = 40
vi. Total credit points including the current semester	: 140.50 +156.00 = 296.50
vii. Overall Grade Point Average	: (296.50/40) = 7.412
viii. Corrected to two decimals	: 7.41 / 10.00

2.15. “Transcript Card” is a consolidated report of grades secured by the student in all the semesters, issued by the University.

3. Admission

3.1. Admission of the student to Diploma in Agriculture/Horticulture in the Faculty of Agriculture shall be on the basis of merit and in accordance with the policy and guidelines of the state government and the University. The minimum admission requirement shall be decided by university and issued from time to time. Decision of the University is final in deciding procedure of admission and finalization of number of seats. Reservation rules shall be made applicable as per norms of the state government.

3.2 Tuition fees and scholarships

The various fees payable by the students will be decided by the University from time to time.

- a.** In case of new admission, the fees for the semester are payable in advance failing which they will not be admitted.
- b.** In other cases, the fees are payable within seven working days from the commencement of the semester.
- c.** In the case of default, a fine as per the University rules will be collected.
- d.** The students who fail to pay the tuition fees within a month of commencement of the semester will not be allowed to attend the classes and their names will be struck off from the rolls. However, if the defaulting students pay the fees along with the fines in addition to a prescribed readmission fee, they will be permitted to attend the classes. The period for which his/her name is struck off from the rolls will be treated as absence for the purpose of calculating the minimum attendance requirements.
- e.** Students who are away on study tour, camp activities or other extracurricular activities organised by the University or the Faculty at the commencement of the semester may, however, pay their semester tuition fees and other fees within the third working day after they return from such programmes, without fine.
- f.** A student who has been granted scholarships by the Welfare Departments or by the Government of India or by the State Government will, however, be exempted from the levy of fines, provided the fees are paid on the next day after the scholarship amount is actually disbursed to him/her. The concession referred above will apply to those who have actually been granted scholarships and not to those who have only applied and are expecting sanction.
- g.** The candidate should obtain a Hall Ticket from the Controller of Examinations through the

Dean after clearing all arrears including the hostel dues before the commencement of each semester final examination.

4. Advisory system

4.1. Dean shall nominate a co-coordinator from amongst the teaching faculty.

4.2. Student ward counselors will be nominated soon after the students' admission. The counselor shall be nominated from amongst the teaching faculty.

5. Curriculum and programme of study

5.1. The students admitted in the university shall be required to follow the curriculum as prescribed, revised by the Faculty and approved by the Academic Council from time to time.

6. Award of Diploma, duration and credit requirements

6.1. A student is required to complete the duration and credit requirements for the award of diploma as decided by Academic Council from time to time.

Sl. No.	Diploma	Duration requirements (Semester)		Credit requirements
		Min.	Max	
1.	Diploma in Agriculture	4	8	65

7. Medium of Instruction

7.1. The medium of Instruction in Diploma in Agriculture shall be English.

8. Attendance Requirements

8.1 One hundred per cent attendance is expected from each student. A student who fails to secure 80 per cent of attendance prescribed for a course (subject) of study, separately in theory and practical shall not be permitted to appear for both theory and practical examinations in that course (subject) and shall be given 'E' (incomplete) and will be required to repeat the course (subject) when offered again.

8.2 For the first year first semester students, for calculating 80 per cent attendance the number of working days will be calculated only from the date of joining of the student.

8.3 If any student is absent for field trips, the student may be marked absent for all the compensating classes on the day of the field trip in addition to the field trip courses.

8.4 The attendance for mid semester examination will be counted as a theory class.

8.5 Students abstaining from the classes by prior permission from the Dean, Faculty of Agriculture on Official University business, shall be given due consideration in computing attendance requirements.

8.6 However, condonation of attendance deficiency may be considered by the Vice-Chancellor only in case of genuine reasons including indoor hospitalization with evidence in the form of Hospitalization certificate and Discharge summary recommended by the Dean, Faculty of Agriculture. The Vice –Chancellor may decide whether or not a condonation fee is required, based on the reason for condonation.

8.7 The student belonging to a batch will attend classes and earn attendance in the particular batch only as per the time table. No student shall be permitted to attend along with another batch to gain attendance either in theory or in practical.

9. Examinations

Each course shall carry a maximum of 100 marks for the purpose of grading. The distribution of marks shall be as follows.

9.1. Course with both theory and practical	Marks
i) Mid Semester Examination	20
ii) Practical Examination (Written = 25, Record = 5 Specimen collection / Assignment = 5 and Viva–Voce = 5)	40
(The question pattern in written part should be uniform in each department)	
iii) Final Theory Examination	<u>40</u>
Total	100
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9.2. Course with only Practical*	Marks
i) Mid Semester Examination	40
ii) Final Semester Examination	<u>60</u>
Total	100
	—

9.3. Evaluation of course work

The results of the course shall be indicated by grade points ranging from 0 to 10.0. The

minimum grade point to be secured for the successful completion of a course will be 6.00. Securing a grade point less than 6.00 in a course will be treated as 'RA' and the grade point will be 0 for calculating the GPA/OGPA. In case of course with theory and practical, minimum of 50 % mark separately in theory and practical with an aggregate of 60 per cent is essential. An OGPA of 6.50 shall be the minimum requirement for the award of Degree.

The following symbols shall be used in the grade sheets.

E	-	Incomplete (due to attendance deficiency)
AB	-	Absent
RR	-	Re-registration
RA	-	Re-appearance
IE	-	Improvement Examination
EE	-	Incomplete for reasons other than attendance

9.4. Evaluation pattern for courses with only practical

The evaluation pattern of courses with only practicals is grouped and mark distribution is furnished below.

A. PED 118 Physical Education (0+1)

The students will be evaluated for 100 marks. The course teacher will evaluate the performance and behavior of students in the classes and marks will be awarded at the end of the first semester as detailed below.

Particulars	Max marks
Attendance and routine activities	60
Behaviour	15
Participation in tournaments	25
Total	100

B. ENG 128 / TAM 228

Particulars	Mid-semester examination	Final examination
Written test	30	40
Continuous evaluation	10	-
Assignment	-	5
Record	-	5

<i>Viva voce</i>	-	10
Total	40	60

C. COM 115

Particulars	Mid-semester examination	Final examination
Written test	30	40
Continuous evaluation	10	-
Assignment	-	5
Record	-	5
<i>Viva voce</i>	-	10
Total	40	60

D. Crop Production AGR 212 & AGR 222

Particulars	Mid-semester examination	Final examination
Field evaluation	20	20
Written examination	20	25
Record	-	5
Assignment	-	5
<i>Viva-Voce</i>	-	5
Total	40	60

Study Tour: AEX 226 (0+1)

The course AEX 226 Study tour is compulsory. The tours will be under taken during fourth semester. The duration of study tour shall not exceed 15 days The tours will be arranged by the respective department of the study in consultation with the Dean, Faculty of Agriculture. The final examination will be conducted separately at the end of the semester by the University. The Marks for the tour are to be awarded as follows

Particulars	Max marks	Evaluation by
Attendance	20	Accompanying staff
Behaviour	20	
Final examination		
Tour Diary	20	By the organising staff/Examiner
Tour record	30	
<i>Viva voce</i>	10	
Total	100	

G. Commercial agriculture CAG 217 (0+2) & CAG 227(0+2)

A student can choose a commercial agriculture programme of his/her choice. The maximum number of students allowed to register in a department will be decided by the Dean depending on enrolment. If more number of students opt for a same department the particular subject mark is considered for selecting a student.

Periodical evaluation of the above course will be done by the course teacher during different stages of work. Final evaluation of the above course will be done by the teacher incharge and another examiner. The final examination will be conducted by the University before the commencement of regular final semester examinations. The distribution of marks will be 40 for periodical evaluation and 60 for final examination.

Particulars	Max marks	Evaluation by
Observation Note book	20	By Teacher in-charge
Proficiency in skill learning	20	
Final examination		
Skills learned	20	By the Examiners
Record	20	
<i>Viva voce</i>	20	
Total	100	

10. Mid-semester examination (MSE)

Writing the mid-semester examination is a pre-requisite for writing the final theory and practical examinations. If a student does not appear for MSE, he/she is not eligible to appear for the final examinations. Such candidate has to reappear for the MSE as and when the respective examinations are conducted only after getting permission from the Dean, Faculty of Agriculture on payment of fee

prescribed by the University. MSE will be conducted by the Dean, Faculty of Agriculture. The answer scripts will be shown to the student after valuation, and returned to the course teacher. The Head of the Department/Division will be responsible to ensure the distribution of answer papers to the students.

10.1 The MSE marks will not be shown separately in the grade sheet but will be combined with the respective final theory and practical marks. MSE marks awarded in a course will be added to the supplementary examinations also.

10.2 The MSE marks will be furnished to the Dean, Faculty of Agriculture through Head of the Department within 10 days after the conduct of MSE. If the student is not satisfied with the award of the marks, he/she shall appeal to the Dean, within three working days after the announcement of marks. The appeal will be considered and the results reviewed by a cell consisting of the Dean and the Head of the Department /Division of Studies concerned. The decision of the Review Cell shall be final. If the Head of the Department himself is the course teacher, one senior member of the department concerned shall be nominated by the Dean.

10.3 The MSE of theory will be one hour duration

For courses with both theory and practical, 20 marks will be apportioned as shown below.

	Marks
i) Fill up the blanks @ ½ mark for 10 questions out of 12	5
ii) Definition @ 1 mark for 5 questions out of 7	5
iii) Short notes @ 2½ marks for 2 questions out of 3	5
iv) Essay type @ 5 marks for 1 question out of 2	<u>5</u>
Total	<u>20</u>

10.4 If the student is not able to write the MSE due to deputation by the University, he/she may be permitted to take up missing MSE. Such examination should be completed ordinarily within 15 working days after the respective MSE.

10.5 A student who fails to attend a mid-semester examination due to unavoidable circumstances shall be permitted with prior approval of the Dean to take up missing examination of the particular course, on payment of fee prescribed by the University. Such tests should be completed ordinarily within 15 working days after the respective MSE.

11. Final examinations

11.1. The final theory and practical examinations will be of three hours duration each.

11.2. Theory examinations will be conducted after practical examinations.

11.3. The question papers for the final theory examinations will be set by the external examiners.

The 40 marks will be apportioned as shown below.

	Marks
i) Fill up the blanks @ ½ mark for 10 questions out of 12	5
ii) Definition @ 1 mark for 5 questions out of 7	5
iii) Short notes @ 2½ marks for 2 questions out of 3	5
iv) Essay type @ 5 marks for 5 questions (either or pattern from each Unit)	25

Total	40

11.4. Central valuation of answer books will be done by examiners on the advice of the Chairman, Board of Examiners.

11.5. Practical Examination

Practical examinations will be conducted separately towards the end of each semester. Proper maintenance and regular submission of practical records are required. Those who do not bring with them the certified practical records/specimen collection/assignments will not be allowed to appear for the practical examination. The marks awarded for specimen collection

and assignments shall be noted in the record, at the time of first appearance and will be taken into account for subsequent appearances. Such marks awarded by the examiner will be furnished to the Head of the Department.

11.6. Two examiners appointed by the University, nominated by Head of the Department and recommended by the Dean will conduct the practical examination.

12. Re-appearance and improvement examination

12.1. Re-appearance and improvement examinations are permitted only for the final theory and practical examinations (retaining marks obtained in mid-semester examination) at the time of semester examination after the payment of fee prescribed by the university. A student is permitted to write re-appearance examination for the failed subjects only three times during n+2 years duration excluding the regular final examination. In the event of a student failing to secure a pass in the three re-examinations permitted, he/she has to

reregister the course along with juniors.

12.2 A student who failed in a course (subject) or awarded EE can take up re-examination without undergoing regular classes. A student who has not fulfilled attendance requirement should repeat the course to earn attendance before he/she is permitted to proceed to the next semester.

12.3 The student having an OGPA of less than 6.50 only is eligible to improve the grade point only once in courses completed earlier in which he/she had obtained grade point less than 8.00. In case a student fails to secure higher grade point in the subsequent attempts, the higher grade point secured by the student either in regular or improvement examination will be accounted.

Improvement and re-examination will not be allowed in courses with only practical. Those who fail in the above subjects shall have to repeat the course in the subsequent year/years.

12.4 Those who miss the study tours for any valid reason must undertake the tour along with juniors to complete the diploma programme

12.5. A continuing candidate cannot appear for more than six subjects in the reappearance examination at a time. The candidate who has completed the tenure of two years in the Diploma Programme (private candidate) cannot appear for more than 12 subjects in the reappearance examination at a time.

12.6 The candidates for the reappearance examinations will submit their applications through the Dean, Faculty of Agriculture who will scrutinize the applications to ensure compliance of regulation 12.1 and 12.3. The attested copy of all grade sheets pertaining to the reappearance examinations should be enclosed along with the applications.

13. Malpractices in examinations

13.1 The Dean, Faculty of Agriculture shall be responsible for dealing all cases of unfair means by students in writing records, assignments and examinations.

13.2 The invigilator or the course teacher concerned shall report each case of unfair means with full details of the evidence and written explanation of the student concerned to the Dean immediately.

13.3 The Dean shall take appropriate steps on receipt of the report and the report will be sent to the Controller of Examinations for appropriate action as prescribed by the University

14. Regulations of student conduct and discipline

14.1 Ragging Rules: Students found involved in ragging or in any other misconduct, or if a complaint is received from the affected student(s) to that effect, will be immediately expelled from the current semester and the Dean shall further constitute a committee to probe and conduct enquiry into the matter and based on the report of the committee, the Dean shall forward the same to the Registrar to pass the final order on merit of case within three working days.

14.2 Unlawful Activities: In case of students found involved in any unlawful activities either within or outside the Hostel/College Campus, besides expulsion both from the Hostel and College, at the discretion of the Dean with the knowledge of the Registrar, the matter will be reported to the Police of the jurisdiction to be dealt with, in accordance with the appropriate law in force.

14.3 Ragging – An offence

Extract of Tamil Nadu Government Gazette – Extra ordinary dt. 29.01.1997 (Tamil Nadu Prohibition of Ragging Act, 1997).

In this Act, unless the context otherwise requires, “Ragging” means display of noisy, disorderly conduct, doing any act which causes or is likely to cause physical or psychological harm or raises apprehension or fear or shame or embarrassment to a student in any educational Institution and includes: teasing, abusing or playing practical jokes on or causing hurt to such student or asking the student to do any act or perform something which such student will not, in the ordinary course willingly act or perform. Ragging within or outside any educational institution is prohibited.

Who ever directly or indirectly commits, participates in, abets or propagates “Ragging” within or outside any educational institution, shall be punished with imprisonment for a term which may extend to two years and shall also be liable to fine which may extend to ten thousand rupees.

Any student convicted of an offence under section 4 shall also be dismissed from the educational institution and such students shall not be admitted in any other educational institution.

Without prejudice to the foregoing provision, whenever any student complains of ragging to the head of an educational institution, or to any other person responsible for the management of the educational institution, such head of the educational institution or person responsible for the management of the educational institution shall inquire into the

same immediately and if found true shall suspend the student who has committed the offence from the educational institution.

On the recommendation of the Dean, Faculty of Agriculture, The Registrar will have full powers to punish any student who violates the rules by imposing a fine, suspension or expulsion. His decision is final and he need not assign any reason or explanation for the punishment awarded.

These rules will be altered or amended, and further rules may be added if necessary. All the rules for the time being in force should be observed by the students.

15. Award of Diploma

The Diploma namely Diploma in Agriculture shall be awarded under the seal of the University to the students who have successfully completed all the Diploma requirement as detailed below.

The candidates should have undergone successfully the prescribed course of study in the University. They shall further be required to have completed and passed 90 course credits and shall have earned an overall grade point average (OGPA) of 6.50 out of 10 for all courses completed in Diploma in Agriculture programme. In addition to the above, students shall in the judgment of the Faculty, possess good conduct and character.

The University shall issue Provisional Certificate (PC) to the candidates after having passed all provisional examinations.

15.1 Class ranking

In calculation of class equivalent for OGPA the following classification shall be adopted.

OGPA	Class
9.00 and above	- Distinction
8.00 to 8.99	- I Class
7.00 to 7.99	- II Class
6.50 to 6.99	- Pass

Removal of difficulties

10.6 If any difficulty arises in giving effect to the provisions of these regulations, based on the recommendations of the Dean, the Vice-Chancellor may issue necessary orders, which appear to him to be necessary or expedient for removing the difficulty.

VISTAS - SCHOOL OF AGRICULTURE
Syllabus of Diploma in Agriculture
(Applicable to the students admitted from 2022)

SEMESTER WISE COURSES

I year I Semester			
Sl. No.	Course No.	Course Title	Credit hours
1.	AGR 101	Principles of Agronomy and Agricultural Meteorology	1+1
2.	AGR 102	Irrigation and Weed Management	1+1
3.	SAC 101	Basics of Soil Science and Nutrient Management	1+2
4.	HOR 101	Nursery Technology of Horticultural Crops	0+1
5.	ENG 101	Agricultural Engineering practices and Post Harvest Technology	1+2
6.	COM 101	English Language and Computer Applications*	0+1
7.	PED 101	Physical Education **	0+1
		Total Credits	4+9=13
		*Team teaching by Computer Science and English	
		**Continued in the II Semester	
I year II Semester			
1.	AGR 103	Agronomy of Field Crops I	1+1
2.	AGR 104	Crop Production I (Wetland crops)	0+2

3.	PGB 101	Agricultural Crop Varieties and their maintenance	1+1
4.	HOR 102	Production Technology of Fruit and Vegetable Crops	2+1
5.	AGM 101	Agricultural Microbiology, Energy and Environmental Studies	1+2
6.	PED 101	Physical Education*	-
7.	AGF 101	Introduction to Forestry	0+1
8.	AGR 105	Study Tour – I	0+1
		Total Credits	5+8=13

I year III Semester

1.	AGR 201	Agronomy of Field Crops II	1+1
2.	AGR 202	Crop Production II (Irrigated crops)	0+1
3.	AEN 201	Economic Entomology, Crop Pests and their Management	1+2
4.	PAT 201	Crop Diseases and their Management	1+2
5.	SST 201	Seed Production Techniques in Agricultural and Horticultural Crops	1+1
6.	CAG 201	Commercial Agriculture I	0+2
		Total Credits	4+9 =13

II year IV Semester

1.	AGR 203	Crop Production III (Dryland Crops)	0+1
2.	AEN 202	Plant protection practices*	0+1
3.	HOR 201	Floriculture, Medicinal, Spices and Plantation Crops	2+1

4.	AMP 201	Fundamentals of Livestock and Poultry Management	2+1
5.	AEC 201	Agricultural Economics, Marketing and Finance	0+1
6.	AEX 201	Extension Methods for transfer of Agricultural technologies	0+1
7.	CAG 202	Commercial Agriculture II	0+2
8.	AEX 201	Exposure visit	0+1
		Total Credits	4+9=13
Grand total			17+35=52

Note: PED X 101 course offered from first semester is registered in second semester and evaluation will be done at the end of second semester

I Semester

Sl. No.	Course No.	Course Title	Credit hours
1.	AGR 101	Principles of Agronomy and Agricultural Meteorology	1+1
2.	AGR 102	Irrigation and Weed Management	1+1
3.	SAC 101	Basics of Soil Science and Nutrient Management	1+2
4.	HOR 101	Nursery Technology of Horticultural Crops	0+1
5.	ENG 101	Agricultural Engineering practices and Post Harvest Technology	1+2
6.	COM 101	English Language and Computer Applications*	0+1
7.	PED 101	Physical Education **	0+1
		Total Credits	4+9

***Team teaching by Computer Science and English**

****Continued in the II Semester**

Note: PED 101 course will be offered from first semester. Registration and evaluation will be done during second semester.

AGR 101 Principles of Agronomy and Agricultural Meteorology 1+1

Objectives

- Basic principles and concepts of agronomy are explained to the students in details since it is a basic subject which assumes significance in agriculture.
- To form basis for further learning of other agronomy courses in subsequent semesters.
- To expose students to the importance and scope of meteorology in agriculture.

Theory syllabus

UNIT I: Introduction to Agriculture

Agriculture - Definition - Scope of agriculture in India and Tamil Nadu – Branches of Agriculture – Agronomy.

UNIT II: Classification of Crops

Classification of Crops - Principles and practices of agricultural operations - Tillage - Intercultural Operations.

UNIT III: Implements in Agriculture

Implements and tools in Agriculture - Cropping Systems - Principles - Merits and demerits - Agroforestry Systems - Seeds and Sowing - Seed treatment.

UNIT IV: Optimum Plant population

Optimum plant population - Crop geometry - Nursery- Transplanting - After cultivation – Manures and fertilizers - Methods of application – Harvesting.

UNIT V: Agricultural Meteorology

Agricultural Meteorology - Weather parameters and their role in crop production - Precipitation- Weather aberrations – Drought- Agro Climatic Zones of Tamil Nadu

Practical

Identification of crops - Agro eco system - Acquiring skill and Practicing tillage implements and special purpose implements - Learning and acquiring skills in seed treatment - Practicing sowing and transplanting - Practicing application of organic manures and green manures - Inorganic fertilizers identification - Practicing various method of fertilizers - Fertilizer requirement calculation - Practicing earthing up - Measurement of growth and yield components - Visiting agromet observatory - Handling rain gauge, maximum, minimum, dry and wet bulb

thermometers - Study of wind vane and anemometers - Evaporimeter - Collection of historic rainfall and temperature data - Computing mean of rainfall data and temperature data -Forecasts- Agro advisories

Course outcome

The course syllabus emphasizes practical experience on various principles and practices involved in agronomy and agricultural meteorology. Hence, the students will certainly be benefited and gain confidence to become a successful entrepreneur in agriculture.

References / Text books

Yellamananda Reddy, T. and G.H. SankaraReddi. 2014. Principles of Agronomy.

Kalyani Publishers, New Delhi.

Mavi, H.S. 1996. Introduction to Agrometeorology, oxford and IBH Publishing Co., NewDelhi.

AGR 102 Irrigation and Weed Management 1+1

Objectives

- To acquire knowledge on importance of water management in agriculture and develop skills on various aspects of water saving technologies to produce more yield per unit of water.
- To understand the significance of weed management in crop production and develop skills on various weed management practices to major field crops to get higher productivity.

Theory Syllabus

UNIT I: Water Resources

Role of water in plant growth - Water resources and irrigation potential of Tamil Nadu - Importance of irrigation - Soil moisture constants - Permanent Wilting Point, Field capacity, Available Soil moisture and Saturation

UNIT II: Crop water requirement

Crop water requirement - Factors affecting water requirement - Critical stages for irrigation and water requirement of crops - Water use Efficiency

UNIT III: Methods of irrigation

Methods of irrigation: surface Methods of irrigation, sub-surface sprinkler and drip irrigation - Micro irrigation: layout, suitability, merits and scope - Water management for different field crops - Quality of irrigation water - Agronomic practices for use of poor quality water (saline, effluent and sewage water) for irrigation.

UNIT IV: Weeds and Classification of weeds

Weeds - Definition, classification and characteristics, harmful and beneficial effect of weeds - Classification and characteristics of weeds of different agro ecosystems - lowland weeds, irrigated upland and rainfed land weeds - Classification and characteristics of weeds - Aquatic, parasitic and obnoxious weeds - Crop weed interactions - Critical crop weed competition, competitive and allelopathic effects of weeds and crops.

UNIT V: Weed Management

Principles and methods of weed management: Preventive, cultural, mechanical, chemical,

biological and alternate methods - Classification and characteristics of herbicides and herbicide formulations - Integrated weed management practices for major field crops - Weed management practices for parasitic and problematic weeds

Practical syllabus

Measurement of irrigation water through water measuring devices (flumes and weirs) - Calculation of irrigation water requirement (problems) - Acquiring skill in land shaping for different surface irrigation methods - Operation and economics of sprinkler and drip irrigation systems - Scheduling of irrigation based on different approaches - On- farm irrigation structures - Visit to irrigation command area (Reservoirs and tanks) and water management institutes. Identification, classification and characterization of weeds of different eco-system - Practicing Skill development on cultural and non chemical weed management - Identification of herbicides and their usage and method of application - Practicing Skill development on herbicide application techniques - Practicing skill development on spray equipment's and spray fluid calibration - Calculation of different weed indices - Calculation of herbicide quantity and recommendation for different eco systems - Practicing skill development on mechanical methods of weed control using different types of weeders .

Course Outcome

By undergoing the course of irrigation & weed management, the students can acquire both theoretical knowledge and practical experience for increasing water use efficiency in agriculture and effective weed management practices to get higher crop productivity.

References

Michael, A.M. 1997. Irrigation: Theory and Practice Vikas Publishers

Prihar, S.S. and B.S. Sandhu. 1987. Irrigation to field crops: Principles and Practices.

ICAR Publication.

Sankara Reddy, G.H. and T. Yellamanda Reddy. 1997. Efficient use of irrigation water.

Kalyani Publishers.

SAC 101 Basics of Soil Science and Nutrient Management 1+2

Objectives

- To impart basic knowledge about soil, its physical and chemical properties
- To educate students about management of problem soils and poor quality water
- To impart knowledge on soil fertility and nutrient availability
- To understand the role of fertilizers and manures in nutrient supply to plants for better fertilizer use efficiency

Theory Syllabus

UNIT I: Physical properties of soil

Soil - composition - Soil physical properties - Colour, Texture, Structure, Bulk density, Pore space, Soil water, Soil air, Soil temperature.

UNIT II : Soil chemical properties

Soil chemical properties - Soil pH and EC. - Soil Organic Matter and its importance on soil properties. Soils of Tamil Nadu.

UNIT III: Problem soils

Problem soils - Physical constraints and their management - chemical constraints - Acid, saline and sodic soils - Management aspects - Irrigation water quality - Management of poor quality water.

UNIT IV: Plant Nutrients and Fertilizers

Plant nutrients - Primary, secondary and micronutrients - Manures and fertilizers - Nitrogenous, Phosphatic and Potassic fertilizers - Secondary and micronutrient fertilizers - Mixed fertilizers and water soluble fertilizers

UNIT V: Nutrient use efficiency

Nutrient use efficiency - methods of fertilizer application - INM - Soil testing and fertilizer recommendations.

Course Outcome

- Basic knowledge about Soil Science, its important physical and chemical properties. Importance of soil constituents on soil properties. Knowledge about problem soils and weed management.

- Imparting knowledge on the essentiality of nutrients, soil fertility management, fertilizer recommendation and nutrient use efficiency.

Practical Syllabus

Soil profile - Master horizon identification - Soil sample collection - Determination of soil texture by feel method - Bulk density, particle density and pore space - Determination of soil moisture - soil colour - Analysis of soil pH and EC - Determination of gypsum requirement for sodic soils - Irrigation water quality analysis and interpretation of data. Identification and application methods of manures and fertilizers. Identification of nutrient deficiencies symptoms in crops - Working out fertilizer requirement for straight and complex fertilizers, INM, organic agriculture - fertilizer recommendation based on STCR equation - Demonstration of DSSIFER and VDK softwares - Preparation of nutrients formulations for foliar spray - Preparation of enriched FYM and MN mixtures - Preparation of slow release fertilizers - Visit to compost unit / fertilizer mixing unit.

References

1. Dilip Kumar Das. 2004. Introductory Soil Science, Kalyani Publishers, New Delhi. Sahai, V.N. 2008. Fundamentals of Soils. Kalyani Publishers, New Delhi.
2. John Havlin, James Beaten, Samuel Tisdale, Werner Nelson, 2005. *Soil Fertility and Fertilizers - An introduction to nutrient management*. 7th Edition, Prentice Hall. Upper Saddle River, NJ.
3. Singh. S.S. 1996. *Soil Fertility and Nutrient Management*. Kalyani Publishers. New Delhi

HOR 101 Nursery Technology of Horticultural Crops 0+1

Objective

To understand and practice the propagation methods of horticultural crops

Practical syllabus

Selection of nursery site and layout of nursery components - Establishment of mother plant block/ scion bank- Media for propagation of nursery plants and pot mixture preparation - Containers, tools and implements for nursery - Plant propagation structures -Practicing raised bed nursery - Protray nursery techniques- Preparation of cutting, layering, grafting and budding in horticultural crops - Specialized plant propagation in horticultural crops - Propagation by tissue culture methods in horticultural crops - Water and nutrient management, plant protection measures in nursery - Project preparation for nursery establishment - Certification of nurseries- Visit to commercial nurseries -Tissue culture units / State Horticulture farms

Course outcome

The students will be familiarized with establishment of nursery and propagation techniques of major horticultural crops

Reference

1. N Kumar 2020, Introduction to Horticulture, 7th Edition. Oxford and IBH Publishing Co Pvt. Ltd., New Delhi, India
2. T. K. Bose, S. K. Mitra, M. K. Sadhu, P. Das and D. Sanyal. 2010. Propagation of Tropical & Subtropical Horticultural crops, Volume 1 (3rd Revised edition). Naya Udyog, 206, Bidhan Sarani, Kolkata 700006.
3. Sharma, R.R. 2005. Propagation of Horticultural Crops – Principles and Practices, Kalyani Publishers, New Delhi
4. Sadhu, M.K. 1989. Plant Propagation. Wiley Eastern Ltd., 4835/24, Ansari Road, Daryaganj, New Delhi 110 002.

ENG 101 Agricultural Engineering practices and Post-Harvest Technology 1+2

Objective

To give hands on practice to understand important concept and practices of irrigation, farm machinery and agricultural Processing equipment, their use in agriculture, and their operation.

Theory

UNIT I Farm Power and Machinery

Mechanization and its advantages and constrain. Farm power sources - Tractor, its controls and operation. Procedure for operating tractor and Power tiller. Tillage - objectives - type of tillage - ploughing methods - animal drawn tillage tools. Chisel plough, Mould board plough, disc plough. Secondary tillage - purpose- equipment for secondary tillage -cultivators, harrows and rotary tillers- their operation. Land shaping with levellers,ridgers and bund formers. Planting machines- tractor drawn seed drills and planters- their calibration and operation. Mechanization of rice cultivation- tractor and power tiller operated puddlers. Rice transplanting- raising rice nursery and use of transplanters. Weeding tools- manual long handled weeders for wet and dry land operation. Use of power operated weeders. Plant protection equipment- manual and power operated equipments- their operation and safe pesticide and weedicide application practice. Harvesting and threshing of crop, principle of operation of combine harvester.

Machinery used in mechanization of horticulture - auger diggers, vegetable nursery machine- machinery for lawn and garden maintenance, fruit harvesters, coconut tree climbers.

UNIT II Agricultural Process Engineering

Physical properties of grains- size, bulk density. Importance and determination of moisture content of grains. Study of grain drying methods and grain drying practice using mechanical drying. Grain cleaning- exercises in operating winnower, and cleaner cum graders.

UNIT III Post Harvest Engineering

Post harvest losses – causes and estimates Rice processing – raw and parboiling – advantages and disadvantages – Unit operations in rice processing – dehusking and polishing - Utilization of wastes and by-products from rice mills - Pulse milling - wet, dry and CFTRI methods of pulse milling -Pulse milling equipment – construction and operation –Fruits and vegetable processing -processed products - Oil extraction methods and machineries

UNIT IV Irrigation Engineering

Measurement of agricultural land and understanding documents relating to land. Conventional

irrigation practice- measuring irrigation water requirement. Methods of conserving and using water for irrigation, irrigation requirement based on soil moisture. Drip irrigation and fertigation systems, their layout- measuring discharge of dripper- maintenance and operation of drip and sprinkler irrigation systems. Study of different types of well. Irrigation structures. Agricultural pump and its operation and maintenance. Green house and its principles- visit to green house and study of its operation. Farm structures for housing animals, and waste disposal structures.

UNIT V Renewable Energy

Bio gas plant- types, technique for proper operation of biogas plant. Solar electric pump system used in agriculture, study of electric fence. Study of gasifier and improved Chula. Application of biomass as energy source for agricultural operations. Exercise in use of solar tunnel dryers for drying agricultural produces.

Practical syllabus

Mechanization and its advantages and constrain. Farm power sources - Tractor, its controls and operation. Primary and Secondary tillage equipment- Land shaping equipment- operation of tractor- Plant protection equipment- Harvesting and threshing of crop, principle of operation of combine harvester- Horticultural mechanization- Properties of grains- Paddy and rice processing- Irrigation system (drip and sprinkler - Application of biomass as energy source for agricultural operations.

Course outcome

- The students will gain experience in application of agricultural Engineering practices on the farm.
- The student will be able to carry out simple operations in irrigation, operation of farm machinery, processing equipment and, renewable energy gadgets on the farm.

References/ Text books

- 1.Jagdishwar Sahay. 2010. Elements of Agricultural Engineering. Standard Publishers and Distributors. Delhi.461 p. ISBN: 81-8014-044-X.
- 2.Chakraverty Amalendu and Paul Singh R. 2014.,Post harvest technology and food process engineering , CRC Press ISBN-13: 978-1-4665-5321-7
- 3.Sahay KM and Singh KK , 2001.,Unit operations of Agricultural Processing. Vikas Publishing House Pvt.Ltd.

COM 101 English Language and Computer Applications 0+1

Objectives

- To make the students competent in day-to-day and Professional Communication skills
- To understand about use of computer and to learn basic computer applications
- To understand the basics of computers and its applications
- To understand the basics of MS Word, MS Excel and MS PowerPoint

Practical Syllabus - English

UNIT I: Listening & Speaking

Listening Cloze (Comprehension) - Note Taking, Self-Introduction - Short Speech (Impromptu) - Welcome Address & Vote of Thanks.

UNIT II: Reading, Writing & Integrated skills

Reading Techniques - SQ4R - Skimming and Scanning, Paragraph Writing - Essay Writing - Letter Writing - Précis Writing, Group Discussion - Resume writing - Interview Skills

Unit III Introduction to Computers

Computer Definition: Hardware - Input devices, Output devices, CPU, Memory concepts.

Software Definition: System software & Application software; Operating System. Basics of GUI - Windows OS; Application Software - Basics of Open Source Software - Office package.

Unit IV Internet and E-Mail

Internet Definition - Applications of Internet; World Wide Web and Web Browsers, Search Engines; Basics of Computer networks - LAN, WAN and MAN; Wireless network. Wi-Fi.

Connecting to internet; URL; Domain name; IP Address; Website Definition - Agricultural Websites - Agritech portal. Basics of Email: Sending and Receiving mails.

Unit V Basics of MS Word, MS Excel and MS PowerPoint

Introduction to MS Office: MS Word - opening, closing, saving and printing of documents; Text creation and formatting; Table handling- insertion, deletion, alignment; Find and replace; Spell

check. MS Excel - opening, saving and closing spreadsheet. Formulas: Sum, Average, Count, Min and Max; Charts - line, bar and pie chart/graph. MS PowerPoint - creating, opening and saving a presentation; Working with slides; Insert: picture, clipart, smart art and shapes; Slide view; Animations – slide and text transition.

Course Outcome

- The students will be familiarized with LSRW Skills -Speaking, Listening, Reading and Writing Skills in English and improve their presentation skills.
- Students will have basic understanding of computers and its applications. They will acquire knowledge about the basic office packages, internet and agricultural websites.

References

1. Goodale, Malcolm, Professional Presentations, Cambridge University, 2005.
2. Greenbaum Sidney, Oxford English Grammar, New Delhi, Oxford University Press.
3. Peregoy, 2009.
4. Jones Daniel, English Pronouncing Dictionary, Cambridge University Press, 2000.

II Semester

Sl. No.	Course No.	Course Title	Credithours
1.	AGR 103	Agronomy of Field Crops I	1+1
2.	AGR 104	Crop Production I (Wetland crops)	0+2
3.	PGB 101	Agricultural Crop Varieties and their maintenance	1+1
4.	HOR 102	Production Technology of Fruit and Vegetable Crops	2+1
5.	AGM 101	Agricultural Microbiology, Energy and Environmental Studies	1+2
6.	PED 101	Physical Education*	-
7.	AGF 101	Introduction to Forestry	0+1
8.	AGR 105	Study Tour – I	0+1
		Total Credits	5+8=13

Note: PED X 101 course offered from first semester is registered in second semester and evaluation will be done at the end of second semester

AGR 101 Agronomy of Field Crops - I 1+1

Objective

To learn the package of practices of Cereals, Millets and Pulses including Rice, Wheat, Maize, Sorghum, Sweet sorghum, Cumbu, Ragi, Minor millets, Red gram, Green gram, Black gram, Soybean, Cowpea, Bengal gram and Horse gram, Cereals and pulses based cropping system

Theory Syllabus

UNIT I : Agronomic Practices of rice

Agronomic Practices including Climatic and Soil Requirement, Land Preparation - Seeds and Sowing - Varieties - Irrigation and Fertilizer Management - Irrigation - Weed Control - intercultural operations Harvesting - Cropping Systems for wetland rice, Transplanted rice & SRI, Direct seeded(wet & Dry) rice

UNIT II : Agronomic Practices of millets

Agronomic Practices including Climatic and Soil Requirement, Land Preparation - Seeds and Sowing - Varieties - Irrigation and Fertilizer Management - Irrigation - Weed Control - intercultural operations Harvesting - Cropping Systems for Millets

UNIT III : Agronomic Practices of pulses

Agronomic Practices including Climatic and Soil Requirement, Land Preparation - Seeds and Sowing - Varieties - Irrigation and Fertilizer Management - Irrigation - Weed Control - intercultural operations Harvesting - Cropping Systems for Pulses.

UNIT IV: Agronomic Practices of cereals

Agronomic Practices including Climatic and Soil Requirement, Land Preparation - Seeds and Sowing - Varieties - Irrigation and Fertilizer Management - Irrigation - Weed Control - intercultural operations Harvesting - Cropping Systems for

UNIT V: IFS Models

Cereals, millets and pulses based cropping systems and Integrated Farming system models for Wetland and garden land - IFS models.

Practical Syllabus

Preparation of Nursery for rice - Various Methods of Nursery preparation -Varieties for different seasons - Utilization of Bio-fertilizers in Rice crop production. Seed Treatment for different crops - Cereals, Millets and Pulses. Practicing Field Preparation and Sowing of Cereals, Millets and Pulses. Studying Cost of Cultivation for important crops.

Course Outcome

Learning agronomic practices and acquiring skill by practicing the techniques.

References / Text Books

1. Crop production guide. 2012. Tamil Nadu Agricultural University and Department of Agriculture, Government of Tamil Nadu.
2. Sankaran, S. and V.T. SubbiahMudaliar. 1997. Principles of Agronomy. The BangalorePrinting and Publishing Co. Ltd., Bangalore.

AGR 102 Crop Production-I (Wetland crops) 0+2

Objectives

To learn and acquiring skill on the package of practices of low land rice.

Practical schedule

The students will learn crop cultivation by doing themselves. Each student will be allotted with a piece of land and do all field operations from field preparation to harvest in the allotted field. Each student will record the observation like germination percentage, plant population, plant height at different stages of the crops, days to 50% flowering, number of grains per panicle, test weight of grains, recording the plot yield and working out the cost of cultivation. The student will maintain cultivation sheet and record of work done with biometric observations and comments on various operations performed and factors of production.

Course Outcome

Learning agronomic practices and acquiring skill by practicing the techniques.

References

1. Crop production guide. 2012. Tamil Nadu Agricultural University and Department of Agriculture, Government of Tamil Nadu.

AGB 101 Agricultural crop varieties and their maintenance 1+1

Objective

To acquire practical knowledge on agricultural crops varieties

Theory Syllabus

UNIT I : Reproduction and different modes

Modes of reproduction - classification of crops based on pollination - varieties - hybrids - definition - types of varieties - hybridization techniques.

UNIT II: General process of varietal development

general process of varietal development - Varieties, synthetics, composites and **UNIT III:**

Hybrid of cereals and

hybrids of agricultural crops: rice, sorghum, pearl millet, maize, finger millet, small millets, redgram, blackgram, greengram, cowpea and horsegram

UNIT IV: Hybrids of oilcrops

groundnut, sesame, sunflower, castor, coconut, cotton, sugarcane, guinea grass, cumbu napier grass, cenchrus, lucerne, desmanthus and subabul

UNIT V: Germplasm

Germplasm - importance of germplasm and its management - maintenance and management of traditional varieties.

Practical Syllabus

Identification of varieties, synthetics, composites and hybrids of agricultural crops and observation of their morphological and biometrical traits: rice, maize, sorghum, pearl millet, maize, finger millet, small millets, redgram, blackgram, greengram, cowpea, horsegram, groundnut, sesame, sunflower, castor, coconut, cotton, sugarcane, guinea grass, cumbu napier grass, cenchrus, lucerne, desmanthus and subabul - Hybrid seed production using male sterile line in rice and redgram and observing the characteristics of A, B and R lines - laying of varietal trials and maintenance of records.

Course Outcome

Students will be familiarized with the latest and popular varieties of agricultural crops and their salient features and their importance

References

1. Phundhan Singh, 2015. Essentials of plant breeding (5th edition), Kalyani publishers, New Delhi.

HOR 102 Production Technology of Fruit and Vegetable Crops 2+1

Objective

To understand the production technology of important fruit and vegetable crops

Theory syllabus

UNIT I: Importance and scope of fruit crop cultivation

Importance and scope of fruit crop cultivation - Study of production technology of fruit crops with reference to soil, climate, varieties, propagation, planting systems, irrigation, nutrient management, fertigation and weed management, training and pruning, role of growth regulators- physiological and nutritional disorders, harvest, yield, post-harvest technology-grading, packing and storage.

UNIT II : Tropical fruits

mango, banana, papaya, guava, sapota, grapes, citrus (acid lime and sweet orange) Sub-tropical and temperate fruits: mandarin orange, pine apple, jackfruit, avocado, apple, pear Arid zone fruit crops: aonla, pomegranate, annona, jamun, Importance of vegetables - nutritive value - types of vegetable garden.

UNIT III: Kitchen garden and Soil less cultivation

kitchen garden/ nutrition garden, truck garden and market garden - Roof top garden -Vertical farming - Hydroponics - Aeroponics - Study of production technology of vegetable crops with reference to soil, climate, varieties, manuring, irrigation, fertigation, weed management - use of growth regulators,

UNIT IV: special horticultural practices

harvesting and yield of tomato, brinjal, chillies, bhendi,; gourds – (ridge gourd, bitter gourd, watermelon, ashgourd) ; onion, garlic; temperate vegetables (cauliflower, cabbage); Tuber vegetables (potato) and root vegetables (tapioca) perennial vegetables (moringa) and leafy vegetables (amaranthus)

UNIT V: Organic production Technology

Organic production technologies in vegetables, organic certification - physiological and nutritional disorders and their corrective measures- Protected cultivation of vegetables (cucumber, tomato and capsicum).

Practical syllabus

Identification of fruit varieties-planning & layout of an orchard-planting systems-selection of planting materials-planting methods-intensive crop cultivation systems-HDP & UHDP-training & pruning-special canopy management-fertigation-mulching-working out fertilizers requirements-special cultivation practices-diagnosis-Nutrient and Physiological disorders-corrective measures. Nursery management practices in vegetable crops- Nutrient management -Weed management- growth regulator application- Special horticultural practices in vegetable crops- Practices in protected cultivation of vegetable crops- Visit to Post harvest handling and value addition units of vegetable crops / polyhouse unit/Progressive farmers field- Visitto Community nursery /Organic certified vegetable field

Course outcome

The students will get familiarized with the production technologies of fruit and vegetable crops

References/ Text books

1. Kumar. N. 2020. Introduction to Horticulture, 7th Edition Oxford and IBH Publishing Co Pvt. Ltd., New Delhi, India
2. Vishnu Swarup. 2014. Vegetable Science and Technology in India. Kalyani Publishers., New Delhi
3. Chadha. K.L. 2003. Handbook of Horticulture. ICAR PublicationsTNAU Agritech portal

AGM 101 Agricultural Microbiology, Energy and Environmental Studies 1+2

Objective

- This course is designed to give students an understanding on what are microbes, their role in agriculture, industry and environment.
- The course encompasses the application of microorganisms as biofertilizers, biocontrol agents, compost production, microbial value addition and preparation of different fermented foods.

Theory syllabus

UNIT I: Microorganisms

Microorganisms (bacteria, fungi, actinobacteria, yeast & algae) - Role of microorganisms in agriculture, industry and environment. - Fermentation processes.

UNIT II: Biofertilizers

Biofertilizers - classification & types - mass production methods, dosage and methods of application.

UNIT III: Biocontrol agents

Biocontrol agents -types - mass production. Shelf life, Quality control and BIS/ FCO standards of biofertilizers.

UNIT IV: Microbes in fermented foods

Microbes in fermented foods - Probiotics - cheese, yogurt. Bread and Wine making. Single Cell Protein - *Spirulina* production.

UNIT V: Environment and waste management

Environment - Components - segments - natural resources - environmental pollution - sources and impacts- waste management - wastewater and solid wastes - disaster management.

Practical syllabus

Introduction to microbiology Instruments / glasswares - Sterilization - Media - Types

- Preparation of media for bacterial biofertilizers - Pilot scale production of bacterial biofertilizers
- mass production of Algal, *Azolla* and AM fungal biofertilizers - Production of biocontrol agents
- production of wine, bread(or visit), cheese, yogurt, Sauerkraut - *Spirulina* mass production / visit. Environmental Sampling techniques - Characterization of water/wastewater - pH,EC, TSS,

TDS, total hardness, BOD, COD, Enumeration of total coliforms - Wastewater treatment methods (physical/chemical/biological) - Characterization of solid wastes - pH, EC, Organic carbon, nitrogen (C:N ratio) - Composting methods - biocompost - vermicompost - Production techniques - Monitoring of composting parameters - Compost maturity assessment - Assessing the nutritive value of compost (Total N, P, K) - Visit to composting units

Course outcomes

1. To know the basic definition and classification of forestry.
2. To be aware of the importance of forestry.

References

1. Michael J. Pelczar, JR., E.C.S. Chan, Noel R. Krieg, 2005. *Microbiology*
2. Casida, JR. L.E. 2006. *Industrial Microbiology*, New Age International Publishers, New Delhi.
3. Subba Rao, N.S., 1999. *Soil Microorganisms and Plant growth*, Oxford & IBA, New Delhi.
4. P.D.Sharma, Ecology and Environment. 2017.(13th Edition),: Rastogi Publications, New Delhi.
5. Tandon, Compost Handbook. 2017. FDCO, New Delhi, India.

AGF101 - Introduction to Forestry (1+0)

THEORY:

UNIT I - Introduction

Introduction—definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies.

UNIT II - Forest Regeneration

Forest regeneration, Natural regeneration -natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers; Artificial regeneration – objectives, Crown classification. Tending operations – weeding, cleaning, thinning –mechanical, ordinary, crown and advance thinning.

UNIT III - Forest Mensuration

Forest mensuration – objectives, diameter measurement, instruments used india meter measurement; Non instrumental methods of height measurement-shadow and single pole method.

UNIT IV - Instrumental Method

Instrumental methods of height measurement - geometric and trigonometric principles, instruments used in height measurement, age determination of trees.

UNIT V - Agro Forestry

Agroforestry – definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens Cultivation practices

ASSIGNMENT

- Collection of agro-forestry seeds of 10 numbers.

Course Outcomes:

3. To know the basic definition and classification of forestry.
4. To be aware of the importance of forestry.

References:

- Introduction to Forestry by C. Nagamani S.R. Reddy, kalyani publication
- Indian Forestry A Breakthrough Approach to Forest Service - 8th Edition, IFS K. Manikandan, S Prabhu (Author), Jain brothers publication.

III Semester

Sl. No.	Course No.	Course Title	Credit hours
1.	AGR 201	Agronomy of Field Crops II	1+1
2.	AGR 202	Crop Production II (Irrigated crops)	0+1
3.	AEN 201	Economic Entomology, Crop Pests and their Management	1+2
4.	PAT 201	Crop Diseases and their Management	1+2
5.	SST 201	Seed Production Techniques in Agricultural and Horticultural Crops	1+1
6.	CAG 201	Commercial Agriculture I	0+2
		Total Credits	4+9

AGR 201 Agronomy of Field Crops - II 1+1

Objectives

To learn the package of practices of oilseeds, commercial crops, Narcotics, forages, green manure including Groundnut, Sesame, Castor, Sunflower, Commercial Crops - Cotton, Sugarcane - Narcotics - tobacco, Forages - fodder sorghum, fodder maize, fodder cumbu, cumbunapier grass, guinea grass, buffel grass, fodder cowpea, berseem, desmanthus, stylosanthus, lucerne - green manure & green leaf manure crops - Oilseeds and commercial crops based cropping system

Theory Syllabus

UNIT I: Oil seeds

Agronomic Practices including Climatic and Soil Requirement, Land Preparation - Seeds and Sowing - Varieties - Irrigation and Fertilizer Management - Weed Control - intercultural operations - Harvesting - Cropping Systems for Oilseeds,

UNIT II: Commercial crops

Agronomic Practices including Climatic and Soil Requirement, Land Preparation - Seeds and Sowing - Varieties - Irrigation and Fertilizer Management - Weed Control - intercultural operations - Harvesting - Cropping Systems for Commercial Crops

UNIT III: Forages

Agronomic Practices including Climatic and Soil Requirement, Land Preparation - Seeds and Sowing - Varieties - Irrigation and Fertilizer Management - Weed Control - intercultural operations - Harvesting - Cropping Systems for Forages

UNIT IV: Green Manure Crops

Agronomic Practices including Climatic and Soil Requirement, Land Preparation - Seeds and Sowing - Varieties - Irrigation and Fertilizer Management - Weed Control - intercultural operations - Harvesting - Cropping Systems for Green Manure Crops.

UNIT V: Cereal Forage crops

Agronomic Practices of Cereal fodder - climatic - soil - land preparation - seeds and sowing - varieties - irrigation - fertilizer management - weed management - intercultural operations - harvesting and anti-nutritional factors in forages.

Practical Syllabus

Various Methods of Nursery preparation - Varieties for different seasons - Utilization of Bio-fertilizers in oil seed and commercial crops. Seed Treatment for different crops - Oilseeds,

Commercial Crops and Green Manure Crops. Practicing Field Preparation and Sowing of Oilseeds and Commercial Crops. Delinting of Cotton - Sett Treatment and Planting Technique of Sugarcane - Silage Making in Fodder crops and their Preservation - Studying Cost of Cultivation for important crops.

Course Outcome

Learning agronomic practices and acquiring skill by practicing the techniques.

References

1. Crop production guide. 2012. Tamil Nadu Agricultural University and Department of Agriculture, Government of Tamil Nadu.
2. Sankaran, S. and V.T. SubbiahMudaliar. 1997. Principles of Agronomy. The Bangalore Printing and Publishing Co. Ltd., Bangalore.

AGR 202 Crop Production II (Irrigated crops) 0+1

Objectives

To learn and acquiring skill on the package of practices of irrigated upland crops.

Practical schedule

The students will learn crop cultivation by doing themselves. Each student will be allotted with a piece of land and do all field operations from field preparation to harvest in the allotted field. Each student will record the observation like germination percentage, plant population, plant height at different stages of the crops, days to 50% flowering, number of grains per panicle, test weight of grains, recording the plot yield and working out the cost of cultivation. The student will maintain cultivation sheet and record of work done with biometric observations and comments on various operations performed and factors of production. There should not be repetition of crop in AGR A 102 Crop Production-I (Wetland crops) 0+2, AGR A 202 Crop Production II (Irrigated crops) 0+1 and AGR A 203 Crop Production III (Dryland Crops) 0+1

Course Outcome

- Learning agronomic practices and acquiring skill by practicing the techniques.

References

Crop production guide. 2012. Tamil Nadu Agricultural University and Department of Agriculture, Government of Tamil Nadu.

AEN 201 Economic Entomology, Crop pests and their management 1+2

Objectives

To understand the fundamentals of insect's life, body structures and functions, economic importance, pest categories, injury and damage, pest management methods in field and horticultural crops.

Theory Syllabus

UNIT I : Basics of insect's life

Understanding the basics of insect's life, distinguishing characters, life cycle and processes. Types of insect wings and legs-importance in flight and locomotion. Economic importance of insects - harmful and beneficial insects.

UNIT II : Pest and categories

Pest - Insects & non- insects: categories of insect pests- pest outbreak- pest monitoring - pest surveillance- forecasting - Economic Threshold Level.

UNIT III: Pest management methods

Pest management methods - cultural, physical, mechanical, behavioural, host plant resistance, botanical, biological control, chemical control and legal methods.

UNIT IV: Crop pests of Agricultural crops

Crop pests- nature of damage and symptoms, life cycle and management: Field crops - rice, sorghum, maize, cumbu, ragi, blackgram, greengram, redgram, cowpea, groundnut, gingelly, sunflower, castor, cotton, sugarcane;

UNIT V: Crop pests of Horticultural crops

Horticultural crops - greens, curry leaf, brinjal, tomato, bhendi, chillies, onion, cucurbits, crucifers, moringa, tapioca, coconut, turmeric, banana, mango, citrus, guava, grapes, sapota, rose, jasmine, tuberose, crossandra & major medicinal plants. - Pests of stored products and their management. Rodents and other non- insect pests and management.

Practical Syllabus

Collection and preservation of insects-External features of grass hopper- metamorphosis & feeding habits- Characteristics of common & economically important insects; grasshoppers, preying mantis, dragonflies & damselflies, termites, thrips, bugs, greenlace wings, true flies, butterflies & moths, beetles & weevils, ants, bees & wasps. Sericulture: mulberry cultivation, rearing of mulberry silk worm, improved methods and appliances, management of pest & diseases. Apiculture-bee species, castes and their duties-colony management, bee enemies; bee keeping appliances, honey extraction

and processing. Pests of stored products. Rodents and other non- insect pests. Study of economically important parasitoids and predators - botanicals in pest management- groups of insecticides in Study of formulations, label information and toxicity parameters of different insecticide groups - plant protection appliances. Nature of damage and types of injury caused by pests. Assessment of insect population and damage-Identification of injury and damage symptoms of field crops - rice, sorghum, maize, cumbu, ragi, blackgram, greengram, redgram, lablab, cowpea, groundnut, gingelly, sunflower, castor, cotton, sugarcane; horticultural crops-greens, curry leaf, brinjal, tomato, bhendi, chillies, cucurbits, crucifers, moringa, tapioca, onion, coconut, turmeric, mango, banana, citrus, guava, grapes, sapota, rose, jasmine, tuberose, crossandra and major medicinal plants.

Course outcome

The students will be familiarized with basic understanding of insects, economic importance, categories of pests, detection of injury caused by pests and assessment of damage, concepts in monitoring and forecasting, various IPM strategies and inputs and pesticide application methods.

References/ Text books

1. B.V. David & V.V. Ramamurthy. 2016. Elements of Economic Entomology, 8th Edition. Brillion Publishers, New Delhi.
2. Regupathy.A and R. Ayyasamy. 2019 (IV Edition). A guide on crop pests. Namrutha Publicaitons, Chennai.389 p.
3. Dhaliwal G.S., and Ramesh Arora.2004. Integrated Pest management concepts and approaches, Kalyani publishers, Calcutta.427p.
4. Muthukrishnan, N., N.Ganapathy, R.Nalini and R.Rajendran.2005. Pest Management in Horticultural Crops. New Madura Publishers, Madurai. 325p. ISBN: 81-902832-0-0
5. Srinivasan. G, R. Pandiyan and P. Karthik.2018. General and economic entomology (Diploma standard). Institute of agriculture, Kumulur, Trichy.163 p.

PAT 201 Crop Diseases and Their Management 1+2

Objective

To study the different plant diseases caused by plant pathogens and to know the principles of plant disease management

Theory Syllabus

UNIT I : Plant diseases Introduction

Plant diseases - Definition, Causes of plant diseases - Fungi, Bacteria, Viruses and Mycoplasma - Survival and mode of spread of plant pathogens - Chemicals in plant disease management - Symptoms - Causal agent-

UNIT II : Major diseases of Cereals and pulses

management of Major diseases of Cereals (Rice, Sorghum, Maize, Cumbu, Ragi), Pulses (Red gram, Black gram, Green gram, Bengal gram, Cowpea, Lablab).

UNIT III : Major diseases of Oilseeds and cash crops

Oil seeds (Groundnut, Gingelly, Sunflower, Castor), Cash crops (Cotton, Sugarcane, Tobacco, Betelvine).

UNIT IV : Major diseases of Fruits and Vegetables

Fruits (Mango, Banana, Grapevine, Sapota, Pomegranate, Papaya) - Vegetables (Tomato, Chillies, Brinjal, Bhendi, Cucurbits, Crucifers, Citrus, Onion, Garlic) - Plantation crops (Coffee, Tea, Rubber, Coconut, Arecanut).

UNIT IV : Major diseases of Spices

Spices (Turmeric, Pepper, Cardamom, Coriander, Ginger) - Flowers (Rose, Jasmine, Crossandra, Chrysanthemum) - Medicinal plants-tuber crops- Management of post-harvest diseases - Mushroom Production and management.

Practical Syllabus

Observation of Plant Pathogens- Identification of symptoms of major diseases of Cereals, Pulses, Oil seeds, Cash crops, Fruits, Vegetables, Plantation crops, Spices and Flowers. Collection and preservation of diseased specimens (Students should submit 25 preserved plant disease specimens)

Course outcome

The students will be familiarized about the plant diseases, identification of symptoms, causal organisms, favourable conditions and IDM practices for the control of plant diseases.

References

1. Diseases of crop plants in India By Rangaswami, G. and Mahadevan, A.
2. Diseases of fruits and vegetable crops recent management approaches By Chand G
3. Diseases of fruit crops By Singh. S. R

SST 201 Seed Production Techniques in Agricultural and Horticultural Crops 1+1

Objective

To Impart practical knowledge on quality seed Production.

Theory Syllabus

UNIT I : Introduction to seed production

Seed - importance - seed quality characteristics; Difference between seed and grain; Difference between grain production and seed production; Generation system of seed multiplication - nucleus, breeder, foundation and certified seed; Seed Multiplication Ratio (SMR) - Seed Replacement Rate (SRR); Principles of seed production - agronomic principles.

UNIT II: Seed production in important agricultural crops

Seed production techniques for varieties and hybrids of cereals and millets - rice, maize, sorghum and cumbu; Seed production techniques for pulses - varieties of greengram, blackgram and cowpea, varieties and hybrids of redgram; Seed production techniques for oilseeds - varieties of groundnut and sesame, varieties and hybrids of sunflower and castor; Seed production techniques for varieties and hybrids of cotton.

UNIT III: Seed production in important horticultural crops

Seed production techniques for varieties and hybrids of tomato, brinjal, chilli bhendi, pumpkin, ashgourd, bittergourd, snakegourd, ribbed gourd and cucumber; Seed production techniques for varieties of cluster bean, lab lab, coriander and onion.

UNIT IV: Post-harvest techniques in seed production

Seed extraction methods; Seed processing - drying, cleaning, grading and upgrading methods and machineries; Methods of seed treatment; Seed storage - methods and containers.

UNIT V: Seed certification and quality regulation

Seed certification - procedures - field Inspection - field and seed standards; Seed quality regulation - salient features of Seed Act (1966), Seed Rules (1968) and Seed Control Order (1983).

Practical Syllabus

Identification of different crop seeds; Practicing pre-sowing seed treatments - dormancy breaking, seed priming, pelleting and polymer coating; Hybrid seed production techniques - detasselling, emasculation and pollination; Supplementary pollination techniques - rice and sunflower; Field inspection - identification of off types, pollen shedders, shedding tassels and rogueing; Identification of physiological and harvestable maturity indices of different crops; Visit to seed production plots; Seed extraction - wet and dry methods; Post-harvest inspection - paddy, pulses,

groundnut, maize and cotton; Seed grading and upgrading techniques; Visit to seed processing unit; Seed moisture estimation, Conduct of germination test and seedling evaluation; Practicing pre-storage seed treatment and packaging; Visit to seed storage godown to study godown sanitation; Economics of seed production.

Course outcome

The students will be familiarized with production, management and post-harvest technologies in seed production of various field crops.

References

1. Agrawal, R.L. 1996. Seed Technology, Oxford & IBH Publishing Co., New Delhi.
2. Copeland, L.O. 1988. Principles of seed science and technology. Surjeet Publications, New Delhi.
3. Gregg, B.G., A.G. Law., S.S. Viridi and J.S. Balis. 1970. *Seed Processing*. National Seed Corp., New Delhi.
4. Trivedi RK and Gunasekaran M. 2014. Compendium on seed legislations. Seeds Division, DAC, MoA, GOI, New Delhi.
5. Amarjit Basra. 2008. Handbook of Seed Science and Technology. CRC Press.
6. Ramamoorthy, K and K.Sivasubramaniam. 2006. Seed Technology: Ready Reckoner. Agrobios (India), Jodhpur.

CAG 201 Commercial Agriculture I 0+2

Organic Inputs and Composting

Objectives:

This course will enable the students in better understanding of organic agriculture, Inputs and composting.

Practical Syllabus

Agricultural, Industrial and Urban wastes - Nutrient potential of different organic manures - Preparation of FYM Compost - Composting methods - Preparation of enriched FYM - Coir pith composting - Sugarcane trash - Press mud - Farm wastes and farm weeds - Parthenium composting - Determination of maturity indices of composts - Commercial utility of organic manures - Visit to compost yard. Introduction to vermicompost - Types of Vermicomposting - Materials for vermicomposting. Preliminary treatment of composting material - Small Scale vermicomposting - Large scale vermicomposting - Other types of vermicomposting - Requirements for vermicomposting - Bedding materials, container, pH, Moisture content, Temperature - Cover feed substrates - Selection of right type of worm species - Preparation of vermicompost beds - Collection of vermicastings, vermiwash and storage - Vermicompost efficiency - Benefit Cost Analysis Application of vermicompost - Visit to Vermicompost unit.

Course outcome

The students will be familiarized with organic agriculture and Input used in Organic Agriculture and methods of organic farming.

References

1. Agrawal, R.L. 1996. Seed Technology, Oxford & IBH Publishing Co., New Delhi.
2. Copeland, L.O. 1988. Principles of seed science and technology. Surjeet Publications, New Delhi.
3. Gregg, B.G., A.G. Law., S.S. Viridi and J.S. Balis. 1970. *Seed Processing*. National Seed Corp., New Delhi.
4. Trivedi RK and Gunasekaran M. 2014. Compendium on seed legislations. Seeds Division, DAC, MoA, GOI, New Delhi.

CAG 201 Commercial Agriculture I 0+2
Commercial Production of Biocontrol Agents

Objective

- Focus on production of different biological control agents and scope in pest management, mass culturing hands on training, project preparation, and entrepreneurial skill development.

Practical Syllabus

Entomology part

Categories of promising bio-control agents - Practicing methods of biological control - Setting up of bio-control laboratory - Preparation of project feasibility report - mass culture of host insects: *Corcyra*, pink mealy bug - Problems in production of host insects - Mass production of *Trichogramma* spp., *Bracon* spp., Green lace wing, Australian lady bird beetle - Problems in production of biocontrol agents - Quality control and assurance - Project Evaluation

Pathology part

Importance of biological control in plant disease management – Handling of equipments – sterilization techniques –Preparation of media- Collection of soil sample and Isolation of antagonists - *Trichoderma*, *Bacillus subtilis* - Maintenance of pure cultures - Morphological characterization of *Trichoderma* and *Bacillus subtilis*-Keys for the identification of lab contaminants - Assessing the efficacy *in vitro* - mode of action of antagonists - Fermentation systems and different kinds of formulations - Mass multiplication - Methods of delivery of biocontrol agents - Bio efficacy against plant diseases – Container content compatibility - packaging methods and shelf life studies of bio control agents-Cost Analysis and project preparation- Guidelines and requirements to establish a commercial bio control lab

Outcome

The students will learn the biocontrol agent's production techniques in such a way that they can start their own enterprise.

Reference

1. Pradyumn Kumar, Jaswinder Kaur, J. C. Sekhar, Soujanya PL. 2017. Mass Production of Biocontrol Agents of Insect Pests. In book: Industrial Entomology, pp.451-465.
2. Baker, K.F. and Cook, R.J. 1974. Biological control of plant pathogens. W.H. Freeman and Co. San Francisco, U.S.A.
3. Chet, I. 1987. Innovative approaches to plant disease control, John wiley and Sons, New York.

4. Dinakaran, D, G.Arjunan&G.Karthikeyan 2003. Biological control of crop diseases.
5. Papavizas, G.C. 1985. *Trichoderma* and *Gliocladium*: biology, ecology and potential for biocontrol. Annu. Rev. Phytopathol. 23 : 23-54.
6. Maheswari ,D.K and R.C Dubey 2008 .Potential micro organisms for sustainable agriculture. I.K International Publishing House Pvt.Lts , New Delhi
7. Prakasam, V., Raguchander, T. and Prabakar, K. 1998. Plant Disease Management. AE Publications, Coimbatore, India.
8. Ahamed S and Narain U 2007 . Eco friendly management of plant diseases. Daya Publishing house , New Delhi
9. Utkhede, R.S. and Gupta, V.K. 1996. Management of soil borne diseases. Kalyani Publishers, New Delhi.

CAG 201 Commercial Agriculture- I 0+2
Commercial Seed Production in Major Crops

Objectives

Students shall raise the commercially important agricultural and horticultural crops for seed production based on the demand and resource availability and shall practice techniques involved in seed production of varieties and/or hybrids. The students shall also be trained on preparation of field layout, nursery and main field preparation, pre-sowing seed treatments, sowing and planting, certification and post-harvest seed handling.

Practical Syllabus

Scope and importance of seed production - generation system of seed multiplication; Planning for seed production - varieties and hybrids; Verification of seed source; Selection of land - isolation - nursery and main field preparation - field layout - pre-sowing seed treatment; Sowing and planting design - planting ratio and border rows; Preparation of sowing report and seed farm registration. Practicing crop specific seed agronomic practices; Hybridization techniques and supplementary pollination; Identification of off-types and rogues - practicing rogueing; Field inspection - practicing field count, assessing field standards and seed yield estimation; Visit to private seed company. Assessment of physiological and harvestable maturity; Pre-harvest sanitation spray; Harvesting methods and threshing; Practicing seed extraction techniques and seed drying; Crop specific post-harvest seed inspection. Seed processing - cleaning, grading and upgrading methods; Processing machineries - operation and maintenance; Visit to seed processing unit - obtaining license for processing unit and seed sale; Assigning seed lot number, bagging, tagging and labeling. Seed sampling and testing - purity, germination and moisture; Pre-storage seed treatments and packaging; Visit to seed storage godown - study of godown maintenance and sanitation; Economics of seed production of varieties and hybrids.

Outcome

The students will learn the biocontrol agent's production techniques in such a way that they can start their own enterprise.

References

1. Agrawal, R.L. 1996. Seed Technology, Oxford & IBH Publishing Co., New Delhi.
2. Singh, B.D. 2005. Plant Breeding Principles and Methods. Kalyani Publishers, New Delhi.
3. Chopra V.L. 2001. Breeding Field Crops. Oxford Publications.
4. Trivedi RK and Gunasekaran M. 2014. Compendium on seed legislations. Seeds Division, DAC, MoA, GOI, New Delhi.

CAG 201 Commercial Agriculture I 0+2

Broiler Production

Objectives:

Students shall raise the commercially important broilers production based on the demand and resource availability and shall practice techniques involved in broilers production.

Practical Syllabus

Preparation of poultry house for receiving new arrivals – Disinfection – Sanitation procedures – Arrangement of Brooders, brooding, spreading of litter and medication – Medication schedule and vaccination - broiler chicks – Measures to control respiratory problems. Coccidiosis and their management problems – Feeding, watering, spacing – Management of litter – Use of growth promoters and feed additives – Improvement of feed intake and feed conversion efficiency – Composition of broiler feeds, feeding ages and consumption levels – Commonly used ingredients in feed mixing for broilers – Least cost feed formulation – Observation on feed consumption, use of stimulants – Recording of body weight of broilers during growth - Management of broilers during summer – winter – Examination of internal organs of poultry – Common basic post mortem findings to know the cause of death – Dressing procedures to prepare ready to cook broilers – Various poultry meat preparations – Maintenance of records – Marketing of broilers – Cost analysis – Economics of broiler farming.

Outcome

The students will learn the broilers production techniques to their own enterprise.

References:

1. Mammoria, C.B. and R.D. Saxena. 1973. Cooperation in India. KitabMahal. Allahabad. Patnaik,
2. V.E. and A.K. Roy. 1988. Cooperation and Cooperative Management. Kalyani Publishers. Ludhiana.

IV Semester

Sl. No.	Course No.	Course Title	Credit hours
1.	AGR 203	Crop Production III (Dryland Crops)	0+1
2.	AEN 202	Plant protection practices*	0+1
3.	HOR 201	Floriculture, Medicinal, Spices and Plantation Crops	2+1
4.	AMP 201	Fundamentals of Livestock and Poultry Management	2+1
5.	AEC 201	Agricultural Economics, Marketing and Finance	0+1
6.	AEX 201	Extension Methods for transfer of Agricultural technologies	0+1
7.	CAG 202	Commercial Agriculture II	0+2
8.	AEX 201	Exposure visit	0+1
		Total Credits	4+9=13
		*Team teaching by Entomology and Pathology	

AGR 203 Crop Production III (Dryland Crops) 0+1

Objectives

To learn and acquiring skill on the package of practices of Short duration/ Dryland crop.

Practical schedule

The students will learn crop cultivation by doing themselves. Each student will be allotted with a piece of land and do all field operations from field preparation to harvest in the allotted field. Each student will record the observation like germination percentage, plant population, plant height at different stages of the crops, days to 50% flowering, number of grains per panicle, test weight of grains, recording the plot yield and working out the cost of cultivation. The student will maintain cultivation sheet and record of work done with biometric observations and comments on various operations performed and factors of production. There should not be repetition of crop in AGR A 102 Crop Production-I (Wetland crops) 0+2, AGR A 202 Crop Production II (Irrigated crops) 0+1 and AGR A 203 Crop Production III (Dryland Crops) 0+1

Course Outcome

- Learning agronomic practices and acquiring skill by practicing the techniques.

References / Text Books

Crop production guide. 2012. Tamil Nadu Agricultural University and Department of Agriculture, Government of Tamil Nadu.

AEN 202 Plant Protection practices 0+1

Objective

- To practice the various pest control methods, mass culturing of natural enemies, pesticide appliances, application methods, calculations of pesticide requirements and use of bio pesticides.
- To know about the different plant protection fungicides, equipment and its application in field level. Further the student able to assess the diseases epidemiology and to produce the bio control agents

Practical syllabus

Practicing various pest control methods; cultural, physical, mechanical methods, behavioral approaches-botanical pesticides, mass culturing of parasitoids and predators, chemical control - practical study of groups of pesticides, their formulations and label information, pesticide application methods, pesticide requirements and safe handling of pesticides.

Plant Protection fungicides - Methods of application of fungicides - Special methods of application - Disease survey - Disease assessment- pre-Immunization techniques - Mass multiplication of Biocontrol agents

Course outcome

The students will be familiarized about the plant protection equipment and mass multiplication of biocontrol agents

References

1. Dhaliwal G.S., and Ramesh Arora. 2004. Integrated Pest management concepts and approaches, Kalyani publishers, Calcutta.427p.
2. Regupathy.A and R. Ayyasamy. 2019 (IV Edition). A guide on crop pests. NamruthaPublicaitons, Chennai.389 p.
3. Srinivasan. G, R. Pandiyan and P. Karthik.2018. General and economic entomology (Diploma standard). Institute of agriculture, Kumulur, Trichy.163 p.
4. Muthukrishnan, N., N.Ganapathy, R.Nalini and R.Rajendran.2005. Pest Management in Horticultural Crops. New Madura Publishers, Madurai. 325p. ISBN: 81-902832-0-0
5. Principles and procedures of plant protection by Chattopadhyay. S
- 6.

HOR 201 Floriculture, Medicinal, Spices and Plantation Crops 2+1

Objective

To impart knowledge and practical skills on concepts and production practices of flower, medicinal, aromatic, spices and plantation crops.

Theory Syllabus

UNIT I : Introduction of flower crops

Definition - area and production - package of practices including soil, climate, varieties, propagation, cultural, manurial and irrigation practices, training and pruning, harvesting, yield, grading and packing of flower crops- rose (loose flower), jasmine, chrysanthemum, marigold, tuberose, crossandra and cockscomb.

UNIT II : Protected cultivation of flower crops:

Protected cultivation of flower crops rose, carnation, gerbera. Garden designs, formal and informal styles of gardening, components of landscape garden, preparing ornamental garden design for home, lawn making and maintenance,

UNIT III: Important flowering annuals and foliage shrubs

Important flowering annuals and foliage shrubs, flowering and foliage trees, herbaceous perennials, cacti, succulents, climbers and creepers, bulbous plants, edges and hedges. Indoor plants and interior decoration, cut flowers, flower arrangement, bonsai culture and dry flower decoration.

UNIT IV: Medicinal plants

Definition - area and production - package of practices including soil, climate, varieties, propagation, cultural, manurial and irrigation practices, training and pruning, harvesting, yield, processing, grading and packing of medicinal plants - coleus, gloriosa, ashwagandha, senna, ocimum, palmarosa, vetiver

UNIT V: Spices and plantation crops

Definition - area and production - package of practices including soil, climate, varieties, propagation, cultural, manurial and irrigation practices, training and pruning, harvesting, yield, processing, grading and packing, value added products of Spices and Plantation crops - black pepper, cardamom, clove, nutmeg, cinnamon, tamarind, turmeric, ginger, coriander, fenugreek, coffee, tea, coconut, arecanut, cocoa, rubber and cashew.

Practical syllabus

Vegetative and seed propagation techniques and nursery practices - rose (loose flower), jasmine, chrysanthemum, marigold, tuberose, crossandra, flowering annuals - Identification and propagation of shrubs, creepers and climbers- preparing ornamental garden design for home –

Interiorscaping, flower arrangement, bonsai culture and dry flower production - Turf establishment and maintenance - Identification of different medicinal crops - Propagation techniques of major medicinal plants -Nursery practices of turmeric, coriander, fenugreek, coconut and cashew- Visit to coconut nursery/plantation - visit to commercial flower fields - visit to Botanic gardens – visit to commercial medicinal and aromatic crop fields.

Course outcome

Students will acquire knowledge on concepts and production practices of flower, medicinal, aromatic, spices and plantation crops

Reference

1. Kumar, N. 2020. Introduction to Horticulture. 7th Edition, Oxford & IBH Publishers, New Delhi.
2. Farooqi, A.A. and B.S. Sreeramu.2004.Cultivation of medicinal and aromatic crops. Universities Press
3. Randhawa, G.S., and A Mukhopadhyay, 1998 Floriculture in India, Allied Publishers Limited, New Delhi
4. Kumar. N, 2005, Introduction to spices, plantation crops, medicinal and aromatic plants. 2nd Edition, Oxford & IBH Publishers, New Delhi
5. Chadha. K.L. 2003. Handbook of Horticulture, ICAR Publications.

AMP 201 Fundamentals of Livestock and Poultry Management 2+1

Objectives

To impart the basic knowledge on livestock and poultry husbandry (cattle, buffalo, sheep, goat, swine and poultry) for enhancing productive and reproductive performance to improve the income of rural economy and effective utilization of livestock farm resources.

Theory Syllabus

UNIT I : Introduction

Importance of livestock and poultry in agriculture - livestock and poultry census - milk, meat and egg production status in India. State and Central Government operated Animal Husbandry Schemes - Common terminologies used in livestock and poultry - Various systems of livestock production - extensive, semi - intensive, intensive and Integrated farming system.

UNIT II: Dairy cattle management

Breeds of dairy cattle (Indian and exotic) - Sahiwal, Gir, Red Sindhi, Jersey and Holstein Friesian - Crossbreds - Characters of drought cattle Breeds - Kangayam cattle, Umbalachery - Breeds of buffalo - Murrah, and Surti - Economic traits of dairy cattle- Breeding methods - Importance - advantages - Selective breeding, cross breeding and grading up. Breeding Management - Definition of Oestrus cycle - Identifications of heat of all livestock species - Definition of Artificial insemination - merits and demerits - optimum time of artificial Insemination - LN2 container maintenance - Elements of Housing Management - Site selection - Types of housing - single row - double row system - head to head - tail to tail arrangement - merits and demerits - Floor space requirement for various categories of animals - Outlines of Care and management of new born calves - importance of colostrum feeding - Composition of colostrums - quantity and feeding schedule of colostrum - Management of pregnant and lactating animals - Care and Management of Work Bullocks - Methods of milking - hand milking - full hand method- stripping, knuckling - machine milking and its advantages and disadvantages - Clean milk production - Importance - Operation - Fodder management of livestock farming - Importance of green fodder - Drought Feeding management - unconventional feed - Foot and mouth disease, Hemorrhagic septicemia and anthrax - symptoms - vaccination schedule for dairy cattle - Biosecurity management - Prevention and control of Mastitis, metabolic diseases - Milk fever, Ketosis and Grass tetany - Mini metabolic profile testing - forecasting of Disease

UNIT III: Sheep and Goat Management

Identification of sheep breeds of Tamil Nadu - Ramnad white, Madras red, Coimbatore, Mecheri, Vembur Trichy black Chevaadu. Identification of Goat breeds - Salem black, Kanniadu, Kodi adu, Tellicherry and Jamunapari. Economic traits - Sheep and Goat - Systems of rearing - extensive - semi intensive, intensive and tethering. Floor space requirement for young and adult - Types of Goat housing - conventional housing - Elevated platform - advantages and disadvantages - Care and management of young and adult stocks - Feeding management of Sheep and Goat - common tree fodders - unconventional Fodder and feed - grazing - Prevention and control of diseases - PPR, Enterotoxaemia, blue tongue, Sheep pox, Orf and Anthrax- symptoms - vaccination schedule - External and internal parasites management.

UNIT IV: Swine management

Breeds of swine - Breed characters of large white Yorkshire - Housing management in pigs - floor space requirement for piglets, sow and boar- Care and management of new born piglets - piglet anemia - creep feeding - Feeding management of sow and boar - swill feeding - Prevention and control of diseases - swine fever and foot and Mouth disease - Porcine Circo virus

UNIT V: Poultry management

Introduction and Definition of broiler, layer and backyard poultry farming / Alternative poultry - Housing systems - cage and deep litter system. Merits and demerits - litter management in broiler housing. Floor space for broiler and layer - Care and management of broiler - brooding, feeding, lighting, housing and disease prevention and control measures - Care and management of layer - brooding, feeding, lighting, housing and disease prevention and control measures - Composition and formulation of ration - pre starter, starter and finisher for broilers: chick mash, grower mash and layer mash for layers - Prevention and control of Ranikhet disease, E.coli and Coccidiosis. - Aflatoxin - Farm records - Culling - Insurance of Livestock - Advantages

Practical Syllabus

External parts of Cattle, Sheep, Goat and poultry / Methods of medication - Identification methods of livestock and poultry - Common restraining methods of cattle, sheep and goat and poultry - Demonstration of disbudding in calves and castration in cattle, sheep and goat - Determination of age by dentition method in cattle, sheep and goat - Study of type and design of livestock and poultry houses - Selection and judging of dairy and draught cattle - Identification of abnormality in quality of milk / visit of milk collection centers / processing plants /Visits of shandy - Identification of abnormality in quality of milk / visit of milk collection centers / processing plants / Visits of shandy - Calculation to find out requirement of farm yard manure per unit land major

crops - Collection of five feed ingredients from native place market and pot culture of one variety of fodder - Feed mixing - Visit of feed mill - Visit to livestock farm - Veterinary University Training and Research Centre / Farm records maintenance - Preparation of brooder house and chicks management - Identification of good layer and poor layer in poultry, Cut up parts of broiler - dressing percentage calculation - Price fixation - Calculation of FCR for broiler and layer - Demonstration of Beak trimming, delousing, deworming and vaccination of poultry - Visit to various livestock and poultry farm.

Course Outcome

The students will acquire the basic needs of livestock and Poultry management.

Reference

1. Hank book of Animal husbandry by ICAR, New Delhi. March 2019, Fifth reprint of Fourth revised edition.

AEC 201 Agricultural Economics, Marketing and Finance 0+1

Objective

- To impart practical knowledge on basic aspects of agricultural economics including farm management, agricultural marketing and farm financial management

Practical Syllabus

Farm Management: Discussion on land and water resources: land use pattern, operational holding, sources of irrigation and cropping pattern in Tamil Nadu. Estimation of cropping intensity and irrigation intensity. Visit to a TNAU / Govt. farm to understand farm layout, resource endowments (farm buildings, machineries, livestock's, irrigation facilities etc) present in the farm and to understand various records viz., DMS, Input Registers, Muster Roll, Stock Registers etc.; Preparation of an interview schedule to collect details on cultivation and marketing cost for annual and perennial crops from farmer; Visit to Farmers field to study the production and marketing problems and collection of farm level data. Depreciation: Methods and calculation of depreciation for farm asset. Estimation of cost of cultivation, income and cost of production for annual and perennial crops. Preparation of financial statements: income/cash flow and net-worth statements. Preparation of partial budget for a technology/modern variety.

Market and market institutions: Marketing channel for agricultural and horticultural crops and price spread estimation. Visit to a Farmer's market / Shandy / Wholesale agricultural market to study the marketing farm produce. Visit to study the role and functions of Regulated market and e-NAM. Visit to FCI / SWC / CWC. Guest Lecture / Visit to Agricultural / Horticulture produce Export firms. Visit to an Input Marketing firm to understand the marketing of inputs. Guest Lecture from the institution / Visit to Primary Agricultural Co-operative Society / Visit to a Commercial Bank / Regional Rural Bank/ NABARD. Revision of portions and preparation for examination

Course Outcome

At the end of this course the students will be exposed to practical knowledge on farm management, and marketing of agricultural commodities and role and functions of various financial and marketing institutions.

References / Text Books

1. Subba Reddy. S, Raghu Ram. P., Neelakanta Sastry. T.V and I. Bhavani Devi, 2004, Agricultural Economics, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Johl, S.S & Kapoor, T.R. 1973. Fundamentals of Farm Business Management. Kalyani Publishers. Ludhiana.
3. Subba Reddy, S and P. Raghu Ram. 2011. Agricultural Finance and Management. Oxford &

IBH. New Delhi.

4. Acharya S.S. and N.L.Agarwal. 2002. Agricultural Marketing in India. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.

AEX 201 Extension Methods for transfer of Agricultural technologies 0+1

Objectives

- To develop knowledge on extension methods, e - Extension, social media techniques, rural institutions and adoption of technologies.
- To impart the skill to the students on extension methods, PRA tools - Social mapping, Resource mapping, transect walk, Seasonal calendar and Venn diagram, social media techniques, Preparation of interview schedule to assess the spread and acceptance of crop varieties and technologies released from Tamil Nadu Agricultural University.

Practical Syllabus

- Study on extension methods and the characteristics of extension worker. Practicing art of Public Speaking. Organizing and conducting Method and Result Demonstrations; trainings, meetings, campaigns, Exhibition and Farmers mela. Preparation of Leaflets, Folders, Poster, Charts and Pamphlets - Both digital and conventional mode, Organizing Front Line Demonstration (FLD), On Farm Trial (OFT) , Multi Location Trial (MLT) and Adaptive Research Trial (ART).
- Studying the organizational structure and functions of ADA / ADH. Studying the structure and functions of Krishi Vigyan Kendra. Exposure to various modes of presentation through Radio and Visit to local media channels to understand its' functions in technology transfer.
- Studying the contents and usage of Uzhavan App, Kisan Suvidha / Mobile Apps. Study on social Institutions - Panchayat, Self Help Groups and Farmers' Organizations.
- Practicing PRA Techniques - Social mapping, Resource mapping, Transect walk, Seasonal calendar and Venn diagram. Preparation of different data collection tools - observation, questionnaire, interview schedule. Interaction with farmers to study the adoption of TNAU released technologies.

Course Outcome

- This course will facilitate the students to become a skilled and successful extension worker at grass-root level

References / Text Books

1. Adivi Reddy A. 1971. Extension Education. Sree Lakshmi Press, Bapatla, Andhra Pradesh.
2. Dahama OP & Bhatnagar OP. 2005. Education and Communication for Development. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

3. Ray, G.L.2006. Extension Communication and Management, Naya Prakash Publications, Kolkata.

CAG 202 Commercial Agriculture II 0+2

Commercial Bee keeping

Objective

To promote students as entrepreneurs in beekeeping by enriching them with knowledge on honeybee species, apiary management, production of honey, beeswax and other byproducts

Practical Syllabus

Collection of bee species and general study - Understanding the economic importance of different bee species and their role in crop pollination; Bee products - honey, bees wax, bee pollen, propolis, bee venom and royal jelly - Identification of bee castes - Biology of bee species Hives and hive construction - Adaptations, communication and behaviour in honey bees- Identification of bee pasturage - Preparation of bee floral calendar- Site selection and establishment of an apiary; Bee keeping Appliances - Hiving of Indian bee feral colonies - Colony management practices - Management of bee colonies for honey Production - Management of bee colonies during honey Production season- lean season - Management of bee colonies for honey Production - Diagnosis and management of bee enemies diseases and poisoning- Introduction to meliponi culture - Quality testing and assurance - Value addition of honey and wax - Economics of bee keeping - Project preparation

Course objectives

The student will learn about the techniques of bee keeping which help in developing their entrepreneurship skills

Reference

1. Ghosh, G. K. (1994). Beekeeping in India. Asish Publishing House, New Delhi.
2. Atuar Rahman, 2017. Apiculture in India. Published by ICAR, New Delhi. ISBN: 978-81-7164-165-9.

CAG A 202 Commercial Agriculture II 0+2

Biofertilizer Production

Objective

This course is designed to provide knowledge about the role of microorganisms as biofertilizers. This course is framed to provide hands on training to the students on the isolation, purification, screening, mass production of bacterial, fungal, and algal biofertilizers. It also narrates about the dosage and method of application.

Practical syllabus

Microorganisms for crop nutrition – biofertilizers - types of biofertilizers - production and demand in India; Importance and contribution of biofertilizers in Agriculture and allied sectors. Sources of good quality strains for biofertilizer production.

Facilities and equipments required for laboratory scale and industrial scale production of biofertilizers. Raw materials required – glass wares, chemicals etc and types of carrier material and its specifications. Production of various bacterial biofertilizers in laboratory scale and large scale - *Rhizobium*, *Azospirillum*, *Azotobacter*, *Glucanoacetobacterdiazotrophicus*, phosphate solublisers, potash releasing microorganisms and PGPR. Selection and mass production of Azolla, Blue Green Algae, PPFM and AM fungi. Shelf life and storage of carrier and liquid based biofertilizers. Constraints in mass production of various biofertilizers. Storage and preservation of various microbial cultures. Quality standards for different commercial biofertilizers - *Rhizobium*, *Azospirillum*, *Azotobacter*, *Glucanoacetobacterdiazotrophicus*, phosphate solublisers, potash releasers, PGPR, Azolla, Blue Green Algae, AM fungi and PPFM. Quality control laboratories in India. Production of carrier based and liquid inoculants. Application technologies – form, dose, method and time of application of biofertilisers - *Rhizobium*, *Azospirillum*, *Azotobacter*, *Glucanoacetobacterdiazotrophicus*, phosphate solublisers, potash releasing, PGPR, Azolla, BGA, AM fungi and PPFM - Evaluation of plant response to biofertilizer application (Nodulation, earliness of germination, plant vigor and biometric observation including root development). Newer formulations of biofertilizers. Calculation of commercial production cost – fixed - cost of building, equipments and glass wares and variable cost - raw materials, maintenance, labour cost etc. Formulation of a project for production of fixed quantum of various biofertilizers per annum. Economics of biofertilizer usage - B:C ratio.

Outcome

This course will provide knowledge about the role of microorganisms as biofertilizers. The students will acquire hands on training on the mass production of bacterial, fungal, and algal

biofertilizers.

References

1. Subba Rao, N.S (2006) Soil Microbiology (4th Edition of Soil Microbiology and Plant Growth). Oxford & IBH, New Delhi
2. Rai, M.K (2006) *Handbook of Microbial Biofertilizers*. Food Products Press. New York.
3. Trivedi, P.C (2008) Biofertilizers. Pointer Publications, New Delhi.
4. Vendhan, R.T (2008) Techniques in Agricultural Microbiology. Agrobios (India)

CAG 202 Commercial Agriculture II 0+2
Commercial Floriculture and Ornamental Gardening

Objective

To impart knowledge and practical skills on concepts and production practices of flower, experiential learning pathways in commercial landscape gardening

Practical Syllabus

Study on cultural requirements of commercial flower crops Jasmine, Rose, Chrysanthemum, Marigold, Tuberose, Crossandra, Cockscomb, Ornamental gardening -Formal and informal gardens - Components of garden - lawns and lawn making - study of important flowering annuals, flowering and foliage shrubs - flowering and foliage trees -creepers and climbers cacti and succulents - palms and cycads - Indoor plants - cut flowers - Flower arrangement- Bonsai culture, dry flower making.

Preparing ornamental garden design for home - Practices in lawn making; different methods of lawn making - Identification of important annuals, herbaceous perennials, shrubs' trees, cacti and succulents, creepers and climbers, bulbous plants and hedge plants - Preparation of pot mixture - potting and reporting practices in raising nursery for ornamental plants - Interior decoration - Visit to commercial flower fields, botanical gardens and horticultural shows.

Outcome

This course will provide knowledge about the landscape gardening. The students will acquire hands on training on production practices of flower.

References

1. Bose.T.K, R.G. Maiti, R.S. Dhua and P.Das. 1999. Floriculture and Landscaping. Naya prakash, Calcutta.
2. Booth. N.K. 1983. Basic elements of landscape architectural design.
3. Randhawa, G.S. and A. Mukhopadhyay, 2001. Floriculture in India. Allied Publishers Limited, New Delhi.

CAG 202 Commercial Agriculture II 0+2

Commercial mushroom production

Objective

The students will be exposed to commercial aspects of mushroom production and processing so as to start their own mushroom enterprise.

Practical Syllabus

Different types of mushroom, - Edible and poisonous type - edible mushrooms-*Pleurotus* and *Calocybe* – preparation of culture media- pure culture techniques- sterilizing techniques-media - glassware - maintenance of culture - Mother spawn production-Multiplication of bed spawn – Substrates -mushroom cultivation techniques for *Pleurotus* and *Calocybe*. - Maintenance of spawn running and cropping room-harvest-packing and storage of *Pleurotus* and *Calocybe*. - Project preparation for *Pleurotus* and *Calocybe* - Problems in cultivation of *Pleurotus* and *Calocybe* – pests, diseases, abiotic disorders -Post harvest technology of *Pleurotus*, *Calocybe*– methods of preservation – Packing methods and storage-*Pleurotus* and *Calocybe*- Recipe making and value added products

Outcome

- The students will learn about the mushroom production techniques in such a way that they can start their own enterprise.

Reference

1. Krishnamoorthy, A.S., Marimuthu, T., and S. Nakkeran. 2005. Mushroom Biotechnology, Vijay Books. Sivakasi, India., Pub.ODL, TNAU, Cbe-3
2. Mushroom Cultivation in India - 2007 by B C (Author), Suman (Author), V P Sharma (Author)

AEX 201 Exposure Visit 0+1

Objective

This programme will be conducted for seven days as prescribed by the syllabus. The students will be placed in the Research Stations / Krishi Vigyan Kendra's to expose practical field experience.

Duration : 7 days

Unit I: Visit to Research Stations

- Study the organizational structure; varieties and technologies released and schemes implemented by the research station
- Study of On Farm Trails and seed production activities, linkage with Department of Agriculture and Allied Sectors.
- Studying farm management along with the registers to be maintained.
- Studying the procedures of data collection from research plots and maintenance of field note/diary.

Unit II: Visit to State Seed Farm

- Understanding the seed production techniques - breeder seeds, foundation seeds, certified seeds by visiting fields.
- Studying the process of seed storage, processing, grading, packaging and distribution.
- Linkage with seed industries and allied departments.

Unit III: Visit to State Horticultural Farm

- Understanding the different propagative material production techniques - grafting, layering; different pruning practices, vegetable seed production techniques - breeder seeds, foundation seeds, certified seeds.
- Studying nursery maintenance and protected cultivation of high value crops
- Visit to Agro Industries to understand the history of firm and nature of business.
- Studying production management, input and labour management, marketing management and financial management.
- Learning how to prepare a viable project based on the field experience.

Outcome

This course will enable the students in update the knowledge about the activities of state horticultural farms, research station and state seed.