

Supernumerary Admission/ Weightages

ORDINANCES

These ordinances shall be called "Ordinances governing, M.Sc. (Ag.) : Agroforestry in the faculty of Agriculture, 2005-06.

1. Academic year

The academic year shall be divided into 2 (Two) semesters of approximately 100 working days each.

- 1.1 Fees : All the seats are under paid seat. The fees paid will be Rs. 10,000/- per semester per student. Rest of the fees, student shall pay as prescribed by the Institute of Agricultural Sciences from time to time.

Part I : Admission and course requirements of M.Sc. (Ag.) Agroforestry

2.0 Admission

2.1 Mode of admission

Admission to the M.Sc. (Ag.) Agroforestry shall be made on merit computed on the basis of marks obtained by candidates in competitive examination called Post Graduate Entrance Test for Agriculture, herein-after abbreviated "PET-Ag" to be conducted by the Controller of Examinations, Banaras Hindu University, on a date and centres to be announced from time to time.

2.2 Eligibility

The Entrance Examination shall be open to Indian citizens only. A candidate shall be eligible to appear at the Entrance Examination if he / she is physically fit and has :

- I Passed the Four Year B.Sc. (Ag.) / three year B.Sc / Environmental Science examination of the University or an equivalent examination recognized by the University.
- II Obtained at least 50% marks in aggregate under the traditional system or an OGPA of 2.5/4, 3.5/5, 4.0/6 and 6.5/10 under the course credit system.
- III Applicants who have secured more than one (1) III division or equivalent OGPA in their academic career shall not be eligible to appear in the entrance examination.
- IV Candidates appearing at the respective qualifying examinations shall be eligible to the entrance examination but shall have to provide the proof of their passing the said examination as and when called for, prior to their admission.

2.3 Number of Seats

On the basis of the entrance examination, admission shall be made to a maximum of twenty five (25) seats including those for SC (15%) and ST (7.5%).

2.4 Supernumerary Seats

- 2.4.1 A maximum of Two (2) supernumerary admissions may be made from among the candidates who have been awarded fellowship by ICAR/ National Organizations on the basis of written test/ interviews provided they fulfill the minimum eligibility conditions for admission. Such candidates shall not be required to appear at the Entrance Examination. Admission of such candidates shall be

made on their inter-se merit of Academic record prepared vice 2.4.2 (Table) of Inst. Agric Sciences syllabus.

2.4.2 A maximum of Two (2) supernumerary admissions may be made from among the foreign nationals holding fellowship / scholarship and sponsored by the Government of India. Such applicants shall not be required to appear at the Entrance Examination. Admission of such candidates shall be made on their inter-se merit of Academic Record rating provided they fulfill all the eligibility conditions for admission. The academic record rating shall be calculated according to the following table :

Examination	Points/division or equivalent OGPA		
	I	II	III
High School or Equivalent	10	7	5
Intermediate or Equivalent	16	9	6
B.Sc. (Ag.) or Equivalent	24	11	7

2.4.3 Admission of B.H.U. Employees

A maximum of Two (2) supernumerary admission may be made from among the permanent employees of the Banaras Hindu University. Such candidates shall be full time students and shall have to fulfill all the eligibility conditions for admission, appear at the entrance examination and obtain qualifying marks for admission. Admission under this category shall be made on their inter-se merit at the entrance examination. Applicants under this category shall apply through proper channel after obtaining a 'No Objection Certificate' and Two (2) years study leave from the Registrar, B.H.U.

2.4.4 Ten per cent supernumerary seats at the Institute level shall be available to the sons/ daughters of the permanent in-service employees of Banaras Hindu University provided they appear and qualify in the entrance examination. Admission in this category shall be made on the inter-se merit of such candidates at the PET-Ag.

2.4.5 Twenty Five Per cent (25%) Supernumerary seats shall be available for admission of candidates nominated by the I.C.A.R. on the basis of combined admission test conducted by the ICAR for M.Sc. (Ag) admission.

2.5 Scheme of Entrance Examination (PET-Ag.)

The examination shall comprise of one paper of two hours duration consisting of objective type questions.

2.6 Syllabus for the Entrance Examination

The question paper shall be based on B.Sc.(Ag) courses generally taught at graduation level.

2.7 Merit List for Admission

2.7.1 Evaluation : Evaluation of answer scripts is based on negative marking system i.e. 50% marks allotted to a question shall be deducted for each wrong answer.

2.7.2 Candidates shall be selected in order of merit on the basis of the aggregate marks secured at the PET-Ag provided that a candidate has obtained not less than 35% marks in the aggregate marks of PET-Ag. In case SC/ST candidates it shall be 30% in aggregate marks of PET-Ag.

2.7.3 In the case of equal marks at the PET-Ag the *inter-se* ranking of the candidates shall be decided in the following order:

- I The aggregate marks / OGPA obtained by the candidates at the qualifying examination recognized for the purpose of appearing in the PET-Ag.
- II If the marks at the above examination are equal the aggregate per cent of marks obtained at Intermediate or equivalent examination.
- III If the marks at the above [Vice 2.7.(ii)]examination happen to be the same, the date of birth would be the basis, i.e. the candidate senior in the age would rank higher.

2.7.4 In all matters relating to M.Sc. (Ag.) admission decision of a Committee comprising the admission committee of the Institute and the admission committee of the respective department shall be final.

2.7.5 No scrutiny / revaluation of the answer books of the PET-Ag shall be allowed

2.7.6 The candidates selected for admission will be informed individually by registered post.

2.7.7 A candidate/ candidates selected for admission may be referred to a Medical Board for Medical Examination for fitness by the Admission Committee.

3.0 Cancellation of Admission

The admission of an M.Sc. (Ag.) student is liable to be cancelled on the occurrence of any of the following :

- I If he /she fails to attend classes, and absents regularly for 15 days or more without permission.
- II If he /she fails to register in any course / thesis credits in any of the semester(s) unless he/she has dropped that semester(s).
- III If his/her attendance is less than 25% in any semester.
- IV On an act of indiscipline as per university rules.

4.0 Residential requirement

Minimum residential requirement shall be four (4) semesters, extendable to a maximum of Eight (8) semesters in total.

5.0 Credit and course requirement

5.1 In order to qualify for the M.Sc. (Ag.) degree a student shall offer not less than 60 credits. The distribution of the credits is given below :

- I Major Discipline : Not less than 30 credits of 500 series courses of which at least 18 credits shall be taken in the form of compulsory courses by all the students as prescribed.

- II Minor discipline : Not less than 15 credits of 500 series courses
- III Thesis : 15 Credits

5.2 A student cannot offer the same course again in any degree programme unless failed.

6.0 Major Discipline

The particular course in which a student is enrolled shall be his/ her major discipline.

7.0 Minor discipline

7.1 A related discipline other than the major discipline in which a student offers at least six credits of courses shall constitute his / her minor discipline.

7.2 A student shall opt courses from at least two minor disciplines excluding the compulsory statistics course (Stat. 501).

8.0 Seminar

A student shall be required to deliver a seminar which will be evaluated as satisfactory / unsatisfactory by the Members of the Advisory Committee, Teacher in-charge of the Seminar and Head of the Department. If unsatisfactory he / she shall be required to deliver it again.

9.0 Credit load per semester

9.1 Credits offered by a student shall be decided by the Chairman of the Advisory Committee

9.2 A student shall offer a minimum of 10 credits and a maximum of 18 credits in each semester including thesis credits.

9.3 A student shall offer at least one core (major) course in each of the first four semesters.

9.4 The minimum prescribed load shall not be mandatory beyond the first four semesters of study.

10.0 Advisory Committee for students

10.1 An Advisory committee comprising three members, two representing the major discipline and one representing the minor discipline shall be constituted.

10.2 The supervisor of the thesis, appointed by the admission committee of the department concerned, shall be the advisor - chairman. The Chairman will nominate the other two members from the minor discipline in consultation with Head of Department.

10.3 Functions of the Advisory Committee

The advisory committee shall guide a student in the choice of courses in the major and minor disciplines, selection of suitable research problem for thesis and in all other matters relating to his/ her academic activities.

10.4 The details of the programme of work prepared by the Advisory Committee, shall be submitted to Head of the Department for onward transmission to the Controller of Examination before the end of each Semester.

Part II: Evaluation of the course work

11.0 Examinations

The students achievements shall be evaluated on the basis of their performance in different tests in the form of written and practical examinations, and thesis and viva-voce examination where applicable. The various tests, their number and relative weightage in each semester shall be as follows.

Name of test	NO	Relative weightage
(i) Theory and practical course		
(a) Mid-semester examination	One	30%
(b) End- semester Examination		
i Theory	One	40%
ii Practical	One	30%
(ii) Theory or Practical course only		
(a) Mid- semester examination	One	40%
(b) End-semester Examination	One	60%

11.1 Mid-semester examination

The mid-semester examination shall be of two hours duration and shall generally cover 50 per cent of the total course.

11.2 End-semester Examination

This examination covering the entire subject matter of a course, shall be held at the end of each semester. The duration of the examination shall be of 3 hours.

11.3 Project report

A project report (about 8-10 pages) comprising work on some assignment, visit to centers of research, extension and demonstration work shall be submitted by each student.

11.4 Wherever a study tour has been prescribed in a course, it shall be compulsory and the student(s) will submit a tour report which will form a part of the practical examination comprising of 10 marks.

12.0 Significance of grades

The examinations conducted throughout the semester shall be evaluated in numerals assigning 100 marks to each course. The numerical rating shall be converted to ten point system by placing a decimal before the last digit called here-in-after 'grade'.

Grade	Expression
8.00 and above	Excellent
7.00-7.99	Good
6.00-6.99	Fair
5.00-5.99	Pass
Below 5.00	Fail

12.1 Equivalence in percent and as division

Grade x 10.0	=	% marks
70% and above	=	First Division
above 60% but below 70%	=	Second Division
Above 50% but below 60%	=	Pass
Below 50%	=	Fail

13.0 Calculation of GP, GPA and OGPA

Grade point and over all grade point average shall be calculated as illustrated hereunder.

Course credit (theory + Practical) practical)	Marks			Total	Grade	Grade point	OGPA
	Mid-term	End-term	Practical				
3 (2+1)	25	33	22	80	8.0	24.0	55.6/ 7 = 7.9
2(2+0)	28	60	-	88	8.8	17.6	
2(0+2)	18	-	52	70	7.0	14.0	
7(4+3)						55.6	

Note :

- Grade point (GP) : Grade x Credit
Grade point average : GP / Credit
Overall grade point average : Total GP / Total Credits
Grade : Total marks in a course – 10

14.0 Submission of grades

The grades shall be sent within 10 days of the conduct of the examination, and the answer books of all the examinations shall be returned to the controller of examination.

15.0 Absence from Examination

A candidate who fails to appear in any of the examinations shall be marked absent and awarded ZERO marks in the examinations.

16.0 Minimum grade point requirement for passing a course / semester/ degree programme

16.1 Minimum grade point (GP) for passing a course shall be 5.00/10

16.2 Minimum grade point average (GPA) for passing a semester shall be 6.0/10.0 provided the student is not carrying a grade of less than 5.00 in any of the courses.

16.3 Minimum overall grade point average (OGPA) for passing an Academic year / Degree programme shall be 6.5/10 provided the student is not carrying a grade of less than 5.00 in any of the courses.

17.0 Promotion from first semester to second semester/current Academic year to the next Academic year

17.1 A student who maintains or fails to maintain the minimum prescribed GPA/ OPGA (clause 33.0) at the end of 1st semester of an Academic year shall be promoted to IInd semester of that Academic year.

17.2 A student who maintains the minimum prescribed GPA/OGPA (clause 33.0) for each of the semesters at the end of II Semester of an academic year and does not carry a grade of less than 5.00 in any course shall be declared to have passed that Academic year and shall be promoted to the next Academic year.

18.0 Improvement of GP/OGPA

18.1 A repeat examination shall be held for both the odd and even semesters after the declaration of results at the end of the concerned academic year for such students as have failed in any of the courses taught during one or both of the semesters or have failed to appear in any of the examinations, if otherwise, eligible.

18.2 Students willing to improve their GP/OGPA may also appear in this examination.

The repeat examination shall also be confidential and may be internally evaluated as provided under clause 28.2

18.3 Student shall not be allowed to improve his/her GP/OGPA after the thesis viva-voce examination.

18.4 The weightage of the Repeat examination shall be as under

Particulars of course	Examination	
	Theory	Practical
Theory + Practical course	70%	30%
Theory course only	100%	---
Practical course only	100%

18.5 The better of the two grades shall be used in the computation of GP/OGPA

18.6 Only one chance shall be given to a candidate for improving his/her GP in course.

18.7 In case a student appearing at the repeat examination vice clause 35.1 supra fails to obtain the minimum prescribed GP/GPA/OGPA he/she shall be declared to have failed in the class where studying.

19.0 Re-admission

Students who have failed to maintain the minimum prescribed GP/GPA1/OGPA (clause 35.8) or who have been detained from appearing in the examination due to shortage of attendance (clause 42.0) may be readmitted on application, if otherwise eligible. A student can be readmitted once only in the same class.

19.1 Re-admission of a failed student

19.1 A post graduate student (M.Sc. (Ag.)) may be re-admitted in the current semester. He/she shall be required to complete the degree programme within 4 (four) semesters over and above the /minimum prescribed residential period counted from the date of his/ her first admission.

19.2 Readmission of a detained student

Students having at least 25% attendance in aggregate may be readmitted on application. Those having less than 25% attendance shall not be eligible for readmission. Student may be readmitted in the current semester.

19.3 In case re-admitted student, readmitted on failure or after detention, fails again at the end of the academic year in the main as well as in the repeat examinations, he/she shall be removed from the rolls of the Institute.

20.0 Registration in a Course

The students shall be required to register for course/ courses within 15 days of the admission / start of the semester.

21.0 Dropping of a course

A student with approval of his / her advisor and the Head of the Department may drop a course within 21 days of registration.

22.0 Dropping of semester (s)

22.1 Under exceptional circumstances student with the prior permission of the Head of the Department under intimation to the Dean / Director, may be allowed to drop a semester(s). However, a student cannot be allowed to drop the first semester of the degree programme.

22.2 An student may be allowed to join in the current semester. Such a student/s will join within fifteen (15) days of the start of the semester.

23.0 Scrutiny

A student finding some discrepancy in his transcript will submit an application within two weeks from the date of declaration of his results to the Director / Dean who will have the results scrutinized.

24.0 Unfair Means

Students found using unfair means during any examination shall be governed by the University Ordinances as applicable at that time.

25.0 Attendance requirement

Each student is required to have a minimum of 75% attendance in aggregate in each semester failing which he/she shall not be permitted to appear at the End Semester examination.

25.1 Leave of absence on project / thesis

After the approval of his / her project work / thesis student may be allowed leave of absence for 15 days in a semester for carrying out research related work outside head quarter.. This period shall be considered while calculating his/her attendance.

26.0 Merit of student

26.1 The Merit shall be decided on OGPA

26.2 Students having same OGPA shall be bracketed together.

26.3 A student who has improved his / her OGPA by repeating a course/ courses or by readmission or by studying extra semester, over and above the minimum prescribed, shall not be eligible for merit.

26.4 A student who has dropped a semester shall also not be eligible for merit.

27.0 Transcript of student

The Transcript of a student shall indicate :

I Course number, course title, credit value, grade, GPA/OGPA and comprehensive, seminar, viva-voce and thesis examination reports and the title of the thesis wherever applicable.

II A transcript shall be issued for each of the semesters.

III Successive transcripts shall carry forward the GPA/OGPA unto the last semester. A combined transcript shall be issued after the completion of the degree programme.

IV The status of a student shall be indicated on the transcript as re-admitted in the semester where re-admitted.

V The result shall be indicated as : PASSED/ FAILED/ PROMOTED as may be applicable.

VI Course / courses repeated by a candidate shall be indicated by suffix «(R)».

VII The Transcripts will carry the following formula for the conversion of OGPA in to per cent marks.

$$\text{OGPA} \times 10 = \% \text{ marks}$$

Part III : Special examinations

28.0 Comprehensive examination

28.1 A student shall be eligible to appear at the comprehensive examination as soon as he/she successfully completes at least 75% of his/her course requirement. The examination shall be oral and shall be conducted by the Advisory committee vice a notification under intimation to the Head of the Department. No grades shall be awarded in this examination. The performance will be judged as Satisfactory / Unsatisfactory.

28.2 In case the performance of a student is judged unsatisfactory he/she shall be required to appear again after a lapse of at least 8 weeks from the last oral examination.

29.0 Thesis Supplication

29.1 An M.Sc. (Ag.) student shall submit his/ her thesis towards the end of the minimum residential period but before 25th July, provided he/she has successfully completed all the examinations of the previous semesters and also the comprehensive examination.

29.2 A student submitting his/ her thesis after 25th July shall be required to register for ZERO credits and pay full semester fees.

29.3 A student who submits his/ her thesis in a subsequent semester (vice clause 46.1 supra) shall be awarded degree of the academic session in which he/she submitted the thesis.

29.4 The thesis shall be accepted in the office of the Head of the Department for onward transmission to the Controller of Examination, only on the production of an up-to-date "No Dues" certificate by the student.

30.0 Thesis Evaluation

30.1 Appointment of Examiner(s)

The M.Sc. (Ag.) thesis shall be evaluated by the Chairman of the Advisory Committee and one External Examiner. The name of the External Examiner shall be proposed by the Board of Examiners of the Department. The Board of examiners shall coopt the Chairman of the Advisory Committee of a student for appointment of the External Examiner.

30.2 The examiners will give a detailed report on the thesis making a clear-cut recommendation whether "Satisfactory / Unsatisfactory"

30.3 If one of the reports is "Unsatisfactory" the thesis will be sent to a third examiner, whose report will be final.

30.4 Provided, that any student whose thesis has been adjudged "Unsatisfactory" under clause 47.3 supra may resubmit his/her thesis after a lapse of two semesters.

30.5 Re submission will be permitted once only

30.6 In case the examiner/s recommend revision the revised thesis shall be sent to the same examiner/s for final recommendation.

30.7 If the thesis reports are "Satisfactory", viva-voce examination shall be conducted by the members of the Advisory Committee and the External Examiner who has evaluated the thesis. The examiners shall submit a comprehensive viva-voce report making clear-cut recommendation whether "Satisfactory / Unsatisfactory".

30.8 In case the viva-voce report is "Unsatisfactory" the repeat viva-voce examination shall be conducted after a lapse of at least 8 (eight) weeks from the last viva-voce examination by the same board (vice clause 47.7) .

31.0 Title of the degree

The degrees to be awarded after the successful completion of course shall have the following title :
Master of Science in Agriculture : Agroforestry

SYLLABUS FOR POSTGRADUATE COURSE IN AGROFORESTRY

MAJOR (core courses)

AGF 501: Concepts in Agroforestry 3 Crs. (3+0)

Fundamental concepts in Agroforestry: Scope, global and national needs for Agroforestry: Principles of mixed cropping, multiple cropping and inter-cropping. Agroforestry systems- Agrosilviculture, Silvopastoral, Agrosilvopastoral and others. Agroforestry systems and practices for various agro-climatic zones of India. Selection of Agro-forestry for barren lands, foot hills, eroded lands, water logged and aquatic sites, marginal lands and other fragile eco-systems.

AGF 502: Silvicultural systems in Agroforestry and their Management 3 Crs. (2+1)

Silvicultural systems introduction, definitions, scope, classification, formulation and objectives. Clear felling systems and their modifications, shelter-wood systems, selection system, coppice system. Conversion, reasons for conversion and types of conversion, changing concepts in silvicultural systems. Selection of trees species for agroforestry systems. Selection of companion crops, intercrops and filler crops in orchards. Modern nursery and propagation techniques for trees. Soil working, planting, tending, pruning and other silvicultural operations on agroforestry species. Canopy management in Silvi-Horti and Agro-Horti systems.

Silvo-pastoral systems, forage and fodder needs distribution and productivity of grazing lands in India, nomadic and migratory grazing. Fodder grasses and trees-selection, vegetative development, growth and regrowth. Fodder quality of grasses and trees, grassland improvement and rejuvenation and cultivation of important grasses and fodder trees.

AGF 503: Nutrient Dynamics in Agroforestry 3 Crs. (2+1)

Fundamental aspects of nutrient transformations and dynamics in agroforestry systems. Soil organic matter and nutrient cycling, decomposition of leaf litter and organic residues, decay products and their effect on associated crops. Nitrogen fixation by leguminous trees and crops. Nutritional requirement and nutrient uptake of agroforestry trees and agroforestry systems. Mycorrhizal associations, root secretion and their phyto-toxic effects on crop plants. Soil fertility management and nutrient budgeting for maximizing biomass production in agroforestry systems.

AGF 504: Hydrology & Water Use in Agroforestry 4 Crs. (3+1)

Hydrologic cycle and its components - rainfall, interception, infiltration, soil storage, runoff, evaporation and evapotranspiration. Soil-Water-Plant relations in agroforestry systems. Water requirement of important agroforestry species, management of irrigation water in agroforestry systems. Water harvesting and soil and water conservation aspects of agroforestry. Soil Moisture budgeting and hydrologic modelling of various agroforestry systems.

AGF 505: Climatology and Agroforestry**4 Crs. (3+1)**

Definition, scope and objectives of agrometeorology, Meteorological parameters and their effect on agricultural crops and forest trees. Bioclimatic zones, macro and micro climates and their significance. Observational techniques of micro-climatology.

Establishment of farm observatory, measurement, processing and interpretation of meteorological and weather forecast.

(Optional courses)

AGF 506: Physiological aspects of Agroforestry**3 Crs. (2+1)**

Diagnostic features of important families of agroforestry trees. Water and mineral relations and overview of metabolism in agroforestry. Control of tree growth, growth regulators and environmental factors. Crown growth, elongation and cambial growth. Root growth and competition for growth factors in agroforestry systems. Response of Agroforestry systems to nutrient, salt, temperature and water stress, seed biology.

AGF 507: Ecological aspects of Agroforestry**3 Crs. (2+1)**

Ecology- scope, definition and importance. Ecological problems of the India and world. Ecology of different agroforestry systems, insect, weeds and disease problems and integrated pest management in agroforestry, biological control, predators, birds and wild life in view of co-existence of crop and tree systems. Agroforestry in relation to soil erosion and flood control. Reduction in pollution hazards and preservation of environment through Agroforestry.

AGF 508: Breeding and Improvement of Agroforestry trees**3 Crs. (2+1)**

Role and scope of genetics in tree improvement. Sexual and asexual propagation, genetic variability in trees. Selection methods for plus trees. Provenance test, hybridization, polyploidy and mutations in the improvement, breeding for wood quality, disease and insect resistance, stress and adaptability in trees. Quantitative genetics, genotype- environment interactions. Breeding methods of major agroforestry trees species. Statistical designs in tree breeding. Heterosis breeding, recent techniques in tree improvement. Seed testing and certification.

AGF 509: Environment and Productivity in Agroforestry Systems**3 Crs. (3+0)**

Distribution, exchange and flow of radiant energy, heat and gases under different agroforestry systems. Radiation and energy budgets of agroforestry systems. Productivity in agroforestry systems- food synthesis, translocation and use, growth and development, photosynthetic efficiency, photo-

respiration, photosensitivity and photo-periodism. Productivity potential of different agroforestry systems. Productivity of important agroforestry trees in relation to environmental factors.

AGF 510: Community Land Management and Social Forestry **3 Crs. (2+1)**

Land capability survey's and classification, concept of watershed management, selection of tree species and agroforestry systems for community lands specially problem soils like salt affected soils, saline and acid soils , waterlogged soils, river banks, eroded barren lands, marginal lands and fragile ecosystems. Energy plantations, road side plantations. Management of community nurseries. Plantation and management techniques for community plantations.

AGF 511: Wood Technology and Utilization **3 Crs. (2+1)**

Structure of woods, physical, chemical, and mechanical properties of woods, defects and abnormalities, methods of wood seasoning. Timber preservation and natural durability of timbers. Characteristics of wood adhesives, plywood laminated wood and composite wood products, wood characteristics and identification of some important species. Identification and properties of important timbers. Extraction, conservation and marketing of timber. Modern timber engineering techniques.

AGF 512: Agroforestry Based Industries and their Products **3 Crs. (2+1)**

Definition and scope, grasses, bamboos and canaes, oilseed, medicinal and aromatic plants, tannins and dyes, gums, resins and oleoresins, kattha and cutch, pine oil, cedar oil, drugs, spices and edible products, Distillation and extraction products of different minor forest produce. Tussor and silk. Identification of different minor forest products, visits to industries based on agroforestry products. Processing of minor forest products.

AGF 513: Course Seminar **1 Cr**

MINOR COURSES

(HORTICULTURE)

HOR 505: Tropical and subtropical fruit production **3 Crs. (2+1)**

Origin, history, distribution, commercial importance and export potential; climatic and soil requirements; species and varieties; root stocks and propagation; planting, nutrition and water requirement; major pests, diseases and their control measures; maturity indices and harvesting techniques of papaya, pineapple, avocado, sapota, jackfruit, mango, banana, citrus, grape, guava, litchi and loquat.

HOR 507: Dryland Fruit Production **2 Crs. (1+1)**

Introduction and scope of Dryland, fruit culture, agro-climatic features of dry and arid areas. Special features of the tree species such as ber, Anannas, Fig mulberry, aonla, wood apple, bael, phalsa, jamun, karonda, datepalm, jack fruit, pomegranate, tamarind and sapota, making them amenable to dry conditions. Control of loss of water through transpiration and evaporation. Technique of

conserving soil and soil moisture and increasing the water use efficiency. Orchard development and management practices for all the above cited fruit crops suited-for dryland conditions.

HOR 508: Plantation Crop Production **2 Crs. (1+1)**

Study of origin and distribution, economic importance, taxonomy, classification, varieties, climate and soil requirements, propagation and nursery techniques, selection of mother plant, seed selection, maintenance of nursery, methods of planting, cultural practices, nutrition and water requirements, plant protection and management, factors affecting growth, flowering etc. harvest indices and harvesting quality evaluation and grading of coconut, arecanut, cashewnut, oil palm, cocoa, coffee, tea, rubber etc.

HOR 513: Production Technology of Medicinal Plants **3 Crs. (2+1)**

Introduction, historical account, present status and future prospects. Problems of production and marketing. Study of origin, distribution, species, varieties, climatic and soil requirements, nursery techniques, cultural practices, nutrition and water requirements, use of growth regulators, major pests, and their management and processing and extraction of active ingredients in important medicinal plants such as aloe, ashwagandha, babchi, bacopa, belladonna, buckwheat, centella, cinchona, coleus, costus. Cowhage, datura, digitalis, dioscorea, dubosia, glory lily, guggal, henbane, holy-thistic, honey plant, ipecac, isabgol, kalmegh, liquorice, long pepper, neem, opium poppy, periwinkle, phylanthus amarus, podophyllum, primrose, rauvolifia, roselle, rutin bearing eucalyptus, senna, steroid bearing solanum, sweet flag, sweet worm wood and valerian.

HOR 514: Production Technology of Aromatic Plants **2 Crs. (1+1)**

Introduction, historical account, present status and future prospects. Production methods and use of essential oils. Problems relating to their extraction, purification and marketing. Study of origin, distribution, species, varieties, climatic and soil requirements, nursery technique, cultural practices, nutrition and water requirements, use of growth regulators, plant protection aspects, processing of ambrette, bursera, celery, chamomile, citronella, ocimum, davana, dill, fennel, French basil, geranium, henna, hops, kewada, khus, lavender, lemongrass, lemon scented gum, mint, palmarosa, patchouli, rose, rosemary, saffron, sandal wood, sacred basil, sweet marjoram, tagetus, thyme and tuberose.

(AGRICULTURAL STATISTICS)

STAT 501: Statistical Methods **3 Crs. (2+1)**

STAT 506: Experimental Designs **3 Crs. (2+1)**

AGF 514: Thesis **15 Crs.**

REMEDIAL COURSES

AGR- 111 Principles of Agronomy

3 Crs. (2+1)

Agronomy - History, scope, concepts and principles. Soil as medium of plant growth and its properties. Crops - Classification and distribution. Tillage and tillage implements. Common weeds, their classification, identification and control. Essential elements– role and deficiency symptoms. Manures and fertilizers - their classification and methods of application. Water Management - scope & practices. Seed - characteristics of quality seed, types and agronomic significance.