

**NEW AND RESTUCTURED
UNDERGRADUATE CURRICULA AND SYLLABUS**

for

Agriculture

V.B.S. Purvanchal University, Jaunpur (U.P.)

(B.Sc. (Hons.)-Agriculture

(Semester System as per ICAR 5th Dean Committee Recommendations)

w.e.f. 2019- 2020



Submitted by:

Dean & Conveners, Board of studies

Faculty of Agriculture

V.B.S. Purvanchal University, Jaunpur (U.P.)

Resolution

We the undersigned conveners, Board of Studies, faculty of Agriculture, V.B.S. Purvanchal University, Jaunpur (U.P.) have restructured the respective courses as per ICAR 5th Dean Committee Report-2017. The meeting held on 22/12/2020 along with Dr Vashistha Yati, Ex. Dean Faculty of Agriculture and Dr. O.P. Singh, Dean Faculty of Agriculture, V.B.S. Purvanchal University, Jaunpur (U.P.).

Departments of Faculty of Agriculture:

1. **Agronomy**
2. **Horticulture**
3. **Genetics and Plant Breeding**
4. **Agricultural Chemistry and Soil Science**
5. **Agricultural Entomology**
6. **Plant Pathology**
7. **Agricultural Engineering and Soil & Water Conservation**
8. **Agricultural Economics**
9. **Agricultural Extension**
10. **Animal Husbandry and Dairying**

The restructured syllabus and curricula of above courses are submitted for your kind approval w.e.f. 2019-20.

Dr. Santosh Kumar Singh
(Agronomy)

Dr. D.R. Singh
(Horticulture)

Dr.Alok Kumar Singh
(Genetics and Plant Breeding)

Dr. Awadhesh Kumar Singh
(Agril. Chemistry & soil Science)

Dr. Manoj Tripathi
(Agril. Entomology)

Dr. Yogesh Kumar
(Plant Pathology)

ErJitendra Kumar
(Agril. Engineering)

Dr. Arun Kumar Yadav
(Agril, Economics)

Dr.Nalinj Kumar Mishra
(Agril. Extension)

Dr. Digvijay Singh
(Animal Husbandry and Daiyrying)

Dr. Vashistha Yati
(Ex.Dean Faculty of Agriculture)

Dr. O. P.Singh
(Dean Faculty of Agriculture)

V.B.S..Purvanchal University, Jaunpur (U.P.)

SUMMARY

It is a well known fact that the Indian Council of Agricultural Research (ICAR) is the apex body for coordinating, guiding and managing the agricultural education and research in the whole country with association of the Education Division. The ICAR, which is an autonomous organization of the country, functions under the Ministry of Agriculture and Farmers' Welfare, Govt. of India. Besides agricultural education, ICAR has responsibility for national agricultural system in the entire country.

ICAR is the apex body for quality assurance in higher agricultural education in the country and, thus, strives for maintaining and upgrading quality assurance in higher agricultural education, research and transfer of agricultural technology to farmers. All the Central Agricultural Universities, State Agricultural Universities, Institutions and Deemed to be Universities of the country have been maintaining their standard of quality education in agriculture through ICAR guidelines and recommendations. The most important step for quality improvement of education, the Indian Council of Agricultural Research has been periodically appointing Deans Committees for revision of course curriculum. In the series, Fifth Deans Committee was constituted and given terms of reference considering contemporary challenges for employability of passing out graduates and to adopt a holistic approach for quality assurance in agricultural education.

Considering the fact that the report of the committee needs to be widely accepted, a bottom up approach in respect of curriculum development has been undertaken. To achieve this, inputs from different stakeholders of agricultural education have been obtained at different levels. The Committee has tried to make sure that the report represents a national consensus in respect of various issues that have been flagged to the Committee. The course curricula have been restructured develop much needed skills and entrepreneurial mind-set among the graduates to take up self employment, contribute to enhanced rural livelihood and food security, sustainability of agriculture and be propeller for agriculture transformation. The major recommendations are as listed below:

NEW INITIATIVES PROPOSED BY FIFTH DEANS' COMMITTEE

I. Student READY (Rural and Entrepreneurship Awareness Development Yojana)

In compliance with the Student READY programme launched by the Hon'ble Prime Minister of India on 25th July, 2015, the five components are proposed for conducting one year program in all the UG disciplines.

To reorient graduates of Agriculture and allied subjects for ensuring by assuring employability and develop entrepreneurs for emerging knowledge intensive agriculture the component envisages the introduction of the program in all the Agricultural Universities. Agricultural colleges as an essential prerequisite for the award of degree to ensure hands on experience and practical training. Considering the variation in different streams of agricultural education and feasibility, the Committee proposes to include following components, which are interactive and are conceptualized for building skills in project development and execution, decision-making, individual and team coordination, approach to problem solving, accounting, quality control, marketing and resolving conflicts, etc. with end to end approach in Student READY programme.

•	Experiential Learning/Hands on Training	:	24 weeks
•	Skill Development Training	:	4 weeks
•	Rural Agriculture work Experience (RAWEx)	:	10 weeks
•	In Plant Training/Industrial attachment	:	10 weeks
•	Student Projects	:	10 weeks

The students will be required to have any three of the five components listed above depending on the requirement of their graduate education but it should be implemented for the complete year, so that their education upto level of III year may get right information in IV year and finally they should attend right stage of entrepreneurship.

II. Introduction of common courses in all agriculture disciplines

The Fifth Deans Committee is of the opinion that some of the courses like Environmental Studies and Disaster Management, Communication Skills and Personality Development, Information and Communication Technology, Entrepreneurship Development and Business Management, Agri-Informatics and Economics and Marketing need to be taught in all the undergraduate programmes of agricultural sciences, as these are must for personality development and to deal with the unforeseen circumstances.

III. Introduction of new degree programs

Since Biotechnology has become an important subject in the field of agricultural sciences, the Committee has recommended introduction of B.Tech. (Biotechnology) course in SAUs. Similarly, Sericulture being an important traditional subject the Committee endorses its inclusion as one of the disciplines in agricultural sciences.

It has been observed that the degree in Home Sciences has been losing its importance in the recent past particularly in terms of limited employability. The Committee has recommended to rechristen the discipline of Home Science to Community Science and introduce one more new course in Food Nutrition and Dietetics under the umbrella of Home Sciences along with B.Sc. in Community Science.

IV. Development of DPRs for establishment of colleges

The Deans Committees have been some minimum standards/requirements of the colleges. Fifth Deans Committee has developed a comprehensive Detailed Project Report (DPR) for establishing a college for each discipline.

V. Holistic distribution of courses

The Committee has distributed the courses in a systematic way so as to teach basic courses first followed by principles and finally skill development it is planned to keep courses related to basic fundamentals in first year. theory/practical's and principles with present state of Art of Technology in second year, modern and frontier area of education in third year and Student READY programme of one year in final year.

VI. Declaring degrees in Agricultural Sciences as professional

Indian council of Agricultural Research constituted a Committee to Review Essential Qualifications and Degree Nomenclature of various programmes running in Agricultural Universities under the chairmanship of Dr R.B. Singh. This Committee has recommended considering degree in agriculture as professional. The Fifth Deans Committee endorses this view and recommends declaring all

degrees in agricultural sciences as professional, like veterinary and Animal Science which include undergraduate in:

1. Agriculture
2. Agriculture Engineering
3. Biotechnology
4. Dairy Technology
5. Fisheries
6. Food Technology
7. Forestry
8. Home Science (Community Science)
9. Horticulture
10. Sericulture

At present, V.B.S. Purvachal University, Jaunpur, U.P., India concerned for the course Agriculture only.

VII. Making implementation of recommendations of Deans Committee mandatory

A lot of efforts are made to improve the quality of agricultural education to make it internationally competitive. Implementations of the recommendations of the Fifth Deans Committee to be made mandatory for accreditation of academic programmes and academic institutions by the National Agricultural Education Accreditation Board (NAEB).

ACADAMIC REGULATIONS

UNDER-GRADUATE PROGRAMME (According to recommendation of Fifth (V) Deans' Committee report)

1. Degree Nomenclature:

- B.Sc. (Hons.) Agriculture,

2. System of Education:

- Formal education with Credit Based Semester System.

3. Programme Duration

- Minimum: 8 Semesters (4 academic years)
- Maximum: 14 Semesters (7 academic years)

4. Minimum eligibility requirement for admission:

- Pass in 10+2 examination (Agriculture or in Science-either in Mathematics or in Biology group)

5. Mode of Admission:

- Entrance examination at 10+2

6. Reservation of seats:

Reservation of seats shall be governed by the rules of State government. 25% ICAR seats to be filled through ICAR entrance examination, if ICAR provides students otherwise the seats are filled as per state govt. rule or by university rules and regulations.

7. Semester Duration:

The minimum duration of 110 working days, consisting of 95 instructional day and 15 examination days.

8. Credit Definition:

The University adopted the semester based course work and evaluation in the year 1976. One credit is defined as the lecture of 50 minutes (one period) duration or minimum of two-periods (100 minutes) practical/tutorial work per credit are required. However, for many courses where field work is required, one credit requires 3 periods of field work per week.

9. Medium of Instruction:

- **English and Hindi or in both.**

10. Attendance:

80 per cent. (Relaxation in minimum attendance requirement should be given only in the case of indoor hospitalization).

Record of class attendance: Each Instructor shall maintain a record of the student's attendance in each course taught by him in each semester.

Minimum class attendance: Each student shall be regular in attending classes and shall be required to have a minimum of 80% attendance in each course in each semester, failing which he/she shall not be awarded grade in that course, unless withdrawal from the course is permitted.

The percentage of attendance of a student in course in a semester shall be computed on the basis of the total number of lectures, practical's and tutorials attended by him/her and those actually held between the date of commencement of instruction and the date of closing instruction, irrespective of the date of his/her registration and/or the duration of leave duly granted to him/her.

The Dean may on the recommendation of the instructor/advisor concerned, though the Head of the Department, condone shortage in attendance up to 5% in a course(s) in exceptional circumstances and allow students with an attendance of 75% or more to appear at the final examination. However, on the recommendation of the Dean, the Vice Chancellor may grant a condonation to the extent of 5% and allow students with an attendance of 70% or more to appear at the final examination. In a very exceptional case, if a student fails to secure even 70% attendance, his case can be referred to the Academic Council through Dean for condonation to the extent of further 5% and allow students with an attendance of 65% or more.

Notes:

- 1:-** In computation of percentage of attendance, fractions of 0.5 or above shall be counted as 1.
- 2:-** If student is called upon to repeat a course but/she has already put in required attendance in that course on a previous occasion, above requirements of attendance will not apply in his/her case.
- 3:-** Whenever students resort to mass absence from classes, a fine of Rs. 15.00/ student/day may be levied from all such students. All such students will have to pay this fine before the final examination of the next semester and failure to do so shall render them liable to be debarred from appearing in the examination.

11. Course Curriculum and minimum credits requirement:

The ICAR Model Course Curriculum and Syllabus has been followed to meet regional requirements. The minimum credit requirement for the graduate degree should be **183 credits** for Math/Bio and **184 credit** for Agriculture including non-gradual and remedial courses.

LIST OF COURSES AND THEIR CREDIT DISTRIBUTION OF DIFFERENT SUBJECTS

Prefix of course Code:

A. Prefix of Course Code with Capital Letters

Prefix is the short form of subject's and it denoted by **Three** capital letters i.e.

AGR	:	Agronomy
GPB	:	Genetics and Plant Breeding
SAC	:	Soil Science and Agricultural Chemistry
AES	:	Agricultural Economics and Statistics
PPA	:	Plant Pathology
ENT	:	Entomology
HOR	:	Horticulture
AGE	:	Agricultural Engineering and Soil Water Conservation
EXT	:	Agricultural Extension and Communication
AHD	:	Animal Husbandry and Dairying

B. Prefix of course Code with Numeral Numbers

The numeral prefix with Tree digits indicates the year, semester and Serial of course of subject in that particular semester e.g.

i.AGR - 111-

(AGR)	:	Agronomy
1	:	Year - I
1	:	Semester - I
1	:	First course of Agronomy in First Semester.

ii.AGR - 112-

(AGR)	:	Agronomy
1	:	Year – I
1	:	Semester – I
2	:	Second course of Agronomy in First Semester

iii.AGR - 352-

(AGR)	:	Agronomy
3	:	Year- III
5	:	Semester – V
2	:	Second course of Agronomy in Fifth Semester

iv.HOR -362 –

(HOR)	:	Horticulture
3	:	Year – III
6	:	Semester- VI
2	:	Second Course of Horticulture in Sixth Semester

Discipline-wise Courses

S.N.	New course Code	OldCourse Code	Course title	Credit Hours
1. Agronomy (AGR)				
1	AGR-111	Ag- 106	Fundamentals of Agronomy	4(3+1)
2	AGR-121	Ag- 210	Agricultural Heritage	1(1+0)
3	AGR-231	Ag- 301	Crop Production Technology – I (<i>Kharif</i> crops)	2(1+1)
4	AGR-241	Ag- 401	Crop Production Technology – II (<i>Rabi</i> crops)	2(1+1)
5	AGR-242	Ag- 411	Weed Management (Elective Course)	2(1+1)
6	AGR-351	Ag- 502	Farming System & Sustainable Agriculture	1(1+0)
7	AGR-352	Ag- 507	Practical Crop Production - I (<i>Kharif</i> crops)	2(0+2)
8	AGR-353	Ag-508	Rainfed Agriculture & Watershed Management	2(1+1)
9	AGR-361	Ag- 605	Practical Crop Production - II (<i>Rabi</i> crops)	2(0+2)
10	AGR-362	Ag- 607	Principles of Organic Farming and Precision Farming	2(1+1)
TOTAL				20
2. Genetics and Plant Breeding (GPB)				
1	GPB-111	Ag-102	Fundamentals of Crop Physiology and Taxonomy	3(2+1)
2	GPB-121	Ag-201	Fundamentals of Genetics	3(2+1)
3	GPB-122	Ag- 206	Environmental Studies and Disaster Management	3(2+1)
4	GPB-231	Ag- 302	Fundamentals of Plant Breeding	3(2+1)
5	GPB-241	Ag- 405	Fundamentals of Biotechnology	2(1+1)
6	GPB-351	Ag- 504	Crop Improvement-I (<i>Kharif</i> crops)	2(1+1)
7	GPB-361	Ag-604	Crop Improvement-II (<i>Rabi</i> crops)	2(1+1)
8	GPB-362	Ag- 606	Principles of Seed Technology	3(2+1)
9	GPB-363	Ag- 610	Intellectual Property Rights	1(1+0)
10	GPB-364	Ag- 612	Commercial Plant Breeding (Elective)	3(1+2)
TOTAL				25
3. Soil Science and Agricultural Chemistry (SAC)				
1	SAC-111	Ag-103	Fundamentals of Soil Science	3(2+1)
2	SAC-121	Ag-203	Manures, Fertilizers and Soil Fertility Management	3(2+1)
3	SAC-231	Ag- 305	Fundamentals of Plant Biochemistry	3(2+1)
4	SAC-241	Ag- 404	Problematic soils and their Management	2(1+1)
5	SAC-242	Ag- 408	Agricultural Microbiology	2(1+1)
6	SAC-243	Ag- 411	Bio-pesticides and Bio-fertilizers(Elective)	3(2+1)
7	SAC-351	Ag- 506	Geo-informatics and Nanotechnology	2(1+1)
8	SAC-352	Ag- 512	Agrochemicals (Elective)	3(2+1)
TOTAL				21
4. Agricultural Economics and Statistics (AES)				
1	AES-111	Ag-108	Fundamentals of Agricultural Economics	2(1+1)
2	AES-121	Ag-209	Agri- Informatics and Computer Application	3(2+1)
3	AES-231	Ag- 303	Statistical Methods	2(1+1)
4	AES-232	Ag- 306	Agricultural Finance and Co-Operation	3(2+1)
5	AES-241	Ag- 406	Agricultural Marketing Trade & Prices	3(2+1)
6	AES-351	Ag- 511	Farm Management, Production & Resource Economics	3(2+1)
7	AES-361	Ag-611	Agribusiness Management	3(2+1)

----	AES-112	-----	Elementary Mathematics (Elective) **	2(2+0)
TOTAL				19+2=21
5. Plant Pathology (PP)				
1	PPA-121	Ag- 204	Fundamentals of Plant Pathology	4(3+1)
2	PPA-231	Ag-309	Diseases of Field and Horticultural Crops and their Management-I	3(2+1)
3	PPA-241	Ag- 410	Diseases of Field and Horticultural Crops and their Management-II	3(2+1)
4	PPA-351	Ag- 501	Principles of Integrated Pest and Disease Management	3(2+1)
TOTAL				=13
6. Entomology (ENT)				
1	ENT-111	Ag- 101	Fundamentals of Entomology	3(2+1)
2	ENT-231	Ag-310	Insect Systematic and IPM	2(1+1)
3	ENT-351	Ag- 503	Pests of Crops and Stored Grain and their Management	3(2+1)
4	ENT-361	Ag- 603	Management of Beneficial Insects	2(1+1)
----	ENT- 112	-----	Elementary Biology (Elective) **	2(1+1)
TOTAL				10+2=12
7. Horticulture (HOR)				
1	HOR-121	Ag- 205	Fundamentals of Horticulture	3(2+1)
2	HOR-231	Ag- 304	Production Technology for Fruit and Plantation Crops	2(1+1)
3	HOR-241	Ag-402	Production Technology for Vegetables and Spices	2(1+1)
4	HOR-242	Ag- 412	Hi-tech Horticulture	3(2+1)
5	HOR-351	Ag- 510	Production Technology for Ornamental Crops, MAP and Landscaping	2(1+1)
6	HOR-352	Ag- 512	Micro Propagation Technology (Elective)	3(2+1)
7	HOR-361	Ag- 608	Post-harvest Management and Value Addition of Fruits and Vegetables	3(2+1)
8	HOR-362	Ag- 612	Landscaping (Elective)	3(2+1)
TOTAL				21
8. Agricultural Engineering and Soil Conservation (AGE)				
1	AGE-111	Ag-104	Introductory Agro-meteorology & Climate Change	2(1+1)
2	AGE- 112	Ag- 109	Farm Machinery and Power	3(2+1)
3	AGE-121	Ag-202	Introductory Soil and Water Conservation	3(2+1)
4	AGE-241	Ag- 403	Renewable Energy and Green Technology	2(1+1)
5	AGE-351	Ag- 512	System Simulation and Agro advisory (Elective Course)	3(2+1)
6	AGE-361	Ag-601	Introduction to Forestry	3(2+1)
7	AGE-362	Ag-602	Protected Cultivation and Secondary Agriculture	2(1+1)
TOTAL				18
9. Agricultural Extension and Communication (EXT)				
1	EXT-111	Ag- 105	Comprehension & Communication Skills in English	2(2+0)
2	EXT-112	Ag-110	Human Values and Ethics (non gradial)**	1(1=0)**
3	EXT-121	Ag-207	Fundamentals of Agricultural Extension Education	3(2+1)
4	EXT-231	Ag- 307	Communication Skills and Personality Development	2(1+1)
5	EXT-241	Ag- 407	Rural Sociology & Educational Psychology	2(2+0)
6	EXT-351	Ag- 505	Entrepreneurship Development and Business Communication	2(1+1)
7	EXT-361	Ag- 612	Agricultural Journalism (Elective)	3(2+1)
TOTAL				14
10. Animal Husbandry and Dairying (AHD)				
1	AHD-111	Ag- 107	Introductory Animal Husbandry	2(1+1)
2	AHD-121	Ag- 208	Livestock , Production and Management	3(2+1)
3	AHD-231	Ag- 308	Dairy Technology	3 (2+1)

4	AHD-241	Ag- 409	Principles of Food Science and Nutrition	2(1+1)
5	AHD-351	Ag- 509	Poultry Production and Management	3(2+1)
6	AHD-361	Ag-609	Food Safety and Standards (Elective)	3(2+1)
TOTAL				16
SOME COURSES WILL BE CONDUCTED BY				
	NSS/NCC/Rovers & Rangers/Physical Education & Yoga Practices 1-N.S.S./N.C.C./ Rovers & Rangers 2-Department of Physical Education / Games			2(0+2)
	Comprehension & Communication Skills in English 1-Department of English 2-Department of Agriculture Extension			2(2+0)
	Educational Tour organized by faculty members during semester break between IV & V Semester or VI & VII Semester.			2(0+2)

SEMESTER WISE DISTRIBUTION OF COURSES B.Sc (Hons.)-Agriculture

I- Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	ENT-111	Ag -101	Fundamentals of Entomology	3(2+1)
2	GPB-111	Ag -102	Fundamentals of Crop Physiology and Taxonomy	3(2+1)
3	SAC-111	Ag -103	Fundamentals of Soil Science	3(2+1)
4	AGE-111	Ag -104	Introductory Agro-meteorology & Climate Change	2(1+1)
5	EXT-111	Ag -105	Comprehension & Communication Skills in English	2(2+0)
6	AGR-111	Ag -106	Fundamentals of Agronomy	4(3+1)
7	AHD-111	Ag -107	Introductory Animal Husbandry	2(1+1)
8	AES-111	Ag -108	Fundamentals of Agricultural Economics	2(1+1)
9	AGE-112	Ag -109	Farm Machinery and Power	3(2+1)
10	EXT-112	Ag -110	Human Values & Ethics (non-gradual) **	1(1+0) **
*****	AES-112 / ENT-112	Ag- 111	Elementary Mathematics (Elective) ** 2(2+0) Elementary Biology (Elective) ** 2(1+1)	2**
12	NPY-112	Ag -112	NSS/NCC/Rovers & rangers/Physical Education & Yoga Practices** (Only one course offered by student)	2(0+2) **

**Non-gradual course

TOTAL- 24 +5= 29

II Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	GPB-121	Ag -201	Fundamentals of Genetics	3(2+1)
2	AGE-121	Ag -202	Soil and Water Conservation	3(2+1)
3	SAC-121	Ag -203	Manures, Fertilizers and Soil Fertility Management	3(2+1)
4	PPA-121	Ag -204	Fundamentals of Plant Pathology	4(3+1)
5	HOR-121	Ag -205	Fundamentals of Horticulture	3(2+1)
6	GPB-122	Ag -206	Environmental Studies and Disaster Management	3(2+1)
7	EXT-121	Ag -207	Fundamentals of Agricultural Extension Education	3(2+1)
8	ADH-121	Ag -208	Livestock Production and Management	3(2+1)
9	AES-121	Ag -209	Agri-informatics and Computer Application	3(2+1)
10	AGR-121	Ag -210	Agricultural Heritage **	1(1+0) **

TOTAL28+1=29

III Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	AGR-231	Ag -301	Crop Production technology-I (Karif crops)	2(1+1)
2	GPB-231	Ag -302	Fundamentals of Plant Breeding	3(2+1)

3	AES-231	Ag -303	Statistical Methods	2(1+1)
4	HOR-231	Ag -304	Production Technology Fruits and Plantation Crops	2(1+1)
5	SAC-231	Ag -305	Fundamentals of Plant Biochemistry	3(2+1)
6	AES-232	Ag -306	Agricultural Finance and Cooperation	3(2+1)
7	EXT-231	Ag -307	Communication Skills and Personality Development	2(1+1)
8	AHD-231	Ag -308	Dairy Technology	3(2+1)
9	PPA-231	Ag -309	Diseases of Field and Horticultural Crops and their Management-I	3(2+1)
10	ENT-231	Ag -310	Insect Systematics and IPM	2(1+1)

TOTAL 25

IV Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	AGR-241	Ag -401	Crop Production Technology –II (<i>Rabi Crops</i>)	2(1+1)
2	HOR-241	Ag -402	Production Technology of Vegetables and Spices	2(1+1)
3	AGE-241	Ag -403	Renewable Energy and Green Technology	2(1+1)
4	SAC-241	Ag -404	Problematic Soils and their Management	2(1+1)
5	GPB-241	Ag -405	Biotechnology	2(1+1)
6	AES-241	Ag -406	Agricultural Marketing Trade and Prices	3(2+1)
7	EXT-241	Ag -407	Rural Sociology and Educational Psychology	2(1+1)
8	SAC-242	Ag -408	Agricultural Microbiology	2(1+1)
9	AHD-241	Ag -409	Principles of Food Science and Nutrition	2(1+1)
10	PPA- 241	Ag -410	Diseases of Field & Horticultural Crops and their Management–II	3(2+1)
11	HOR-242	Ag- 412	High-tech-horticulture	3(2+1)
12	SAC-243 / AGR-242	Ag – 411	Elective Course-/Biopesticides and Bifertilizers Weed Management (Only one course offered by student)	3(2+1) 2(1+1)
13	STUDY TOUR	Ag - 413	Educational Tour (Compulsory)	2(0+2)

TOTAL 29 or 30

Note: Educational tour will be conducted by faculty members during break between IV & V Semester or VI & VII Semester

V Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	PPA- 351	Ag -501	Principles of Integrated Pest and Disease Management	3(2+1)
2	AGR-351	Ag -502	Farming System & Sustainable Agriculture	1(1+0)
3	ENT-351	Ag -503	Pests of Crops and Stored Grain and their Management	3(2+1)
4	GPB-351	Ag -504	Crop Improvement-I (<i>Kharif Crops</i>)	2(1+1)
5	EXT-351	Ag -505	Entrepreneurship Development and Business Communication	2(1+1)
6	SAC-351	Ag -506	Geoinformatics and Nano-technology	2(1+1)
7	AGR-352	Ag -507	Practical Crop Production – I (<i>Kharifcrops</i>)	2(0+2)
8	AGR-353	Ag -508	Rainfed Agriculture & Watershed Management	2(1+1)
9	AHD-351	Ag -509	Poultry Production and Management	3(2+1)
10	HOR-351	Ag -510	Production Technology for Ornamental Crops, MAP and Landscaping	2(1+1)
11	AES-351	Ag -511	Farm Management, Production and Resource Economics	3(2+1)
12	SAC-352 / AGE-351/ HOR-352	Ag -512/ Ag-512/ Ag-512	Elective Course-Agrochemicals/System Simulation and Agro-advisory/ Micro Propagation Technolog (Only one course offered by student)	3(2+1)

TOTAL 28

VI Semester

<u>S.N.</u>	<u>New Course</u>	<u>Old Course</u>	<u>Title of the Course</u>	<u>Credit</u>
-------------	-------------------	-------------------	----------------------------	---------------

	Code	Code		
1	AGE-361	Ag -601	Introduction to Forestry	3(2+1)
2	AGE-362	Ag -602	Protected Cultivation and Secondary Agriculture	2(1+1)
3	ENT-361	Ag -603	Management of Beneficial Insects	2(1+1)
4	GPB-361	Ag -604	Crop Improvement-II (<i>Rabi crops</i>)	2(1+1)
5	AGR-361	Ag -605	Practical Crop Production –II (<i>Rabi crops</i>)	2(0+2)
6	GPB-362	Ag -606	Principles of Seed Technology	3(2+1)
7	AGR-362	Ag -607	Principles of Organic Farming and Precision farming	2(1+1)
8	HOR-361	Ag -608	Post-harvest Management & Value Addition of Fruits & Vegetables	2(1+1)
9	AHD-361	Ag -609	Food Safety and Standard	3(2+1)
10	GPB-363	Ag -610	Intellectual Property Rights	1(1+0)
11	AES-361	Ag -611	Agribusiness Management	3(2+1)
12	EXT-361/ GPB-364/ HOR-362	Ag -612/ Ag- 612/ Ag- 612	Elective Course-Agriculture Journalism/Commercial Plant Breeding/Landscaping (Only one course offered by student)	3(2+1)

Total 28

VII Semester

Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)			
S.NO	Activities	Number of weeks	Credit Hours
1	General orientation & On campus training by different faculties	01	14
2	Village attachment	08	
	Unit attachment in Univ./ College. KVK/ Research Station Attachment	05	
3	Plant clinic	0	02
	Agro-Industrial Attachment	03	04
4	Project Report Preparation, Presentation and Evaluation	01	
	Total week of RAWE and AIA	20	20

Agro- Industrial Attachment:

The students would be attached with the agro-industries for a period of **3 weeks** to get an experience of the industrial environment and working.

RAWE Component-I

Village Attachment Training Programme

S.No.	Activity	Duration
1	Orientation and Survey of Village	1 week
2	Agronomical Interventions	1 week
3	Plant Protection Interventions	1 week
4	Soil Improvement Interventions (Soil sampling and testing)	1 week
5	Fruit and Vegetable production interventions	1 week
6	Food Processing and Storage interventions	1 week
7	Animal Production Interventions	1 week
8	Extension and Transfer of Technology activities	1 week

RAWE Component –II

Agro Industrial Attachment

- Students shall be placed in Agro-and Cottage industries and Commodities Boards for 03 weeks

- Industries include Seed/Sapling production, Pesticides-insecticides, Postharvest-processing value addition, Agri-finance institutions, etc.

Activities and Tasks during Agro-Industrial Attachment Programme

- Acquaintance with industry and staff
- Study of structure, functioning, objective and mandates of the industry
- Study of various processing units and hands-on trainings under supervision of industry staff
- Ethics of industry
- Employment generated by the industry
- Contribution of the industry promoting environment
- Learning business network including outlets of the industry
- Skill development in all crucial tasks of the industry
- Documentation of the activities and task performed by the students
- Performance evaluation, appraisal and ranking of students

Modules for Skill Development and Entrepreneurship: A student has to register 20 credits opting for two modules of (0+10) credits each (total 20 credits) from the package of modules in the ---

VIII semester.

Sl. No.	Title of the module	Credits
1	Production Technology for Bio-agents and Biofertilizer	0+10
2	Seed Production and Technology	0+10
3	Mushroom Cultivation Technology	0+10
4	Soil, Plant, Water and Seed Testing	0+10
5	Commercial Beekeeping	0+10
6	Poultry Production Technology	0+10
7	Commercial Horticulture	0+10
8	Floriculture and Landscaping	0+10
9	Food Processing	0+10
10	Agriculture Waste Management	0+10
11	Organic Production Technology	0+10
12	Commercial Sericulture	0+10

Note: In addition to above ELP modules other important modules may be given to the students by SAUs/University/College

Evaluation of Experiential Learning Programme/ HOT

S.No.	Parameters	Maximum Marks
1	Project Planning and Writing	10
2	Presentation	10
3	Regularity	10
4	Monthly Assessment	10
5	Output delivery	10
6	Technical Skill Development	10
7	Entrepreneurship Skills	10
8	Business networking skills	10
9	Report Writing Skills	10
10	Final Presentation	10
	Total	100

Discipline-wise summary of credit hours

S.N. Group	Credits
1 Agronomy	20
2 Genetics & Plant Breeding	25
3 Soil Science & Agricultural Chemistry	21
4 Entomology	12
5 Agricultural Economics and Statistics	21
6. Agricultural Engineering and Soil & Water conservation	18
7.Plant Pathology	13
8. Horticulture	18
9. Agricultural Extension	14
10. Animal Production-Animal Husbandry and Dairying	17

S.N. Group	Credits
11 English	
12 Remedial Courses (Elementary Biology or Mathematics)	
13 NSS/NCC/Rovers & Rangers/Physical Education & Yoga Practices	
14 Human Values and Ethics	
15 Educational Tour	

Total 179 credit selective
20 +20

RAWE
ELP

Grand Total = 179+20+20=219

NEW COURSES

Sl. No. Course Title

1. Geo-informatics and Nanotechnology
 2. Rainfed Agriculture and Watershed Management
 3. Problematic Soils and their Management
 4. Renewable Energy and Green Technology
 5. Management of Beneficial Insects
 6. Fundamentals of Horticulture
 7. Introduction to Forestry
 8. Agri- Informatics
 9. Intellectual Property Rights
 10. Principles of Food Science & Technology
 11. Communication Skills and Personality Development
 12. Principles of Integrated Pest & Diseases Management
 13. Agricultural Heritage
 14. Introductory Biology
 15. Elementary Mathematics
 16. Human Values & Ethics (NG) *
- * Non-gradual courses

Elective Courses: A student can select three elective courses out of the following and offer during 4th, 5th and 6th semesters.

S.N. Courses	Credit Hours
1. Agrochemicals	3(2+1)

2. Commercial Plant Breeding	3(1+2)
3. Landscaping	3(2+1)
4. Biopesticides and Biofertilizers	3(2+1)
5. Weed Management	3(2+1)
6. System Simulation and Agro-advisory	3(2+1)
7. Agricultural Journalism	3(2+1)

12. Advisement:

- Student freshly admitted as well as continuing students shall present themselves in the beginning of each semester on dates notified by the Registrar for advisement and shall be assigned in groups to staff. Advisors/course instructors are nominated by the Dean Agriculture/Principal.
- The advisor shall help the UG student in planning the programme of their studies and the choice of courses. He shall also guide the student in determining the credit load, which he can safely and conveniently carry in each semester and shall advise him regarding adding of or withdrawal from the course during a semester. Each Advisor shall maintain a close contact with his student and keep himself informed of their progress. Problem cases needing special measures shall bring to the notice of the Dean by the Advisor.

13. Registration:

Following advisement as prescribed above, registration of candidates selected for admission and also of continuing students shall be completed on schedule date(s) notified earlier by Registrar/ Dean / Principal for each semester.

Mode of Registration:

Registration shall consist of the following steps:

- Payment of the college and university fee and other dues.
- Enrolment of the students in various courses with individual instructors at particular place, date and time.

Registration of fresh students:

Registration for the first Semester of the year of a PG degree programme is part of admission procedure and shall be governed by the admission rules. Admission of new students so fallen vacant shall be offered to the candidates in the waiting list.

Registration of continuing students:

Registration of continuing students in the subsequent semesters shall be held in a similar way on the date time notified by the Register/ Dean/ Principal

Late registration:

A continuing student, who does not register on the day of registration, shall be required to pay a prescribed the registration fee for the first day and further prescribed fee for subsequent two days.

Note: *If under special circumstances, a student is unable to present him/self herself for registration, he/she may, with the prior permission of the Principal permitted to deposit his/her fee by the prescribed date through his/her representative. However, he/she should present himself/herself for registration*

within a period of 10 days from the initial date of the registration on payment of a prescribed late fee failing which he/she will not be allowed registration in that semester.

Registration necessary for award of degree:

In case, a student studies a course without registration in the prescribed manner, he/she will liable to be summarily dropped from the University.

14. Examination and Evaluation System

A. Examination

- **Theory** – Paper setting and evaluation of answer books will be incorporated through inside and outside university examiners as per guidelines of University.
- **Practical**- The practical examination of the course / courses will be conducted by both internal and external examiners as per rules of university.
- **Mid-term examinations**- The mid-term examination will be conducted by course instructor /instructors on college / university expenses but answer books will be supplied by the Registrar or Examination controller of the university.

B. Marks Distribution

a. Courses with Theory and Practical

- **Mid-term Examination-** 20% of the total marks
- **Practical Examination-** 30% of the total marks
- **Final Theory Examination-** 50% of the total marks

b. Courses with only Theory

- **Mid-term Examination-** 50% of the total marks
- **Final Theory Examination-** 50% of the total marks

c. Courses with only Practical

- **Practical Examination -** 100%.

Note :

- Paper to be set by external/Internal examiner shall ensure the coverage of the entire prescribed syllabus both in Hindi and English .
- If needed moderation can be done for final theory exam papers..
- Syllabus of the concerned course shall be sent to the examiner, who shall prepare the question papers.
- For practical, it is recommended that examination shall be conducted by External examiner nominated by University and internal examiner nominated by Principal of the Colleges.
- The ratios between External and Internal Examiner shall be appointed as per university rules and regulations for paper setting / evaluation of answer book / practical examinations

C. REGISTRATION OR FILLING OF UNIVERSITY EXAMINATION FORM FOR SEMESTER EXAMINATION

- It shall be mandatory to submit the complete examination form before each and every semester examination. The first and last date will be decided by university and shall be properly advertized by the Registrar / Controller of Examination. The fee or fees applicable according to university's rules and regulations.

- It is also advised to the students those who will interest to **clear the repeated course/ courses** shall also be submitted their repeated course/ courses in the examination form with additional fees when ever applicable. (**course of ODD semester in consecutive ODD SEMESTER, similarly course of EVEN SEMESTER in consecutive EVEN SEMESTER**)

Evaluation of Experiential Learning Programme/HOT (Hand on Training)

S.No.	Parameters	Max. Marks
1.	Project Planning and writing	10
2.	Presentation	10
3.	Regularity	10
4.	Monthly Assessment	10
5.	Output delivery	10
6.	Technical Skill Development	10
7.	Entrepreneurship Skills	10
8.	Business networking skills	10
9.	Report Writing Skills	10
10.	Final Presentation	10
	Total	100

Evaluation and Grading

Percentage of Marks Obtained	Conversion into Points
100	10 Points
90 to <100	9 to <10
80 to <90	8 to <9
70 to <80	7 to <8
60 to <70	6 to <7
50 to <60	5 to <6
<50 (Fail)	<5
VIZ. 80.76	8.076
43.60	4.360
72.50 (but shortage in attendance)	Fail (1 point)

OGPA	Division
5.000-5.999	Pass
6.000-6.999	II division
7.000-7.999	I division
8.000 and above	I division with distinction

GPA = Total points scored/Total credits (for 1 semester)

CGPA = \sum Total Points Scored / Course credits

OGPA = \sum Total Points Scored (after excluding failure points / Course Credits

% of Marks= OGPA x 100/10

FINAL EXAMINATION:

Final examinations shall be held on the dates, which shall be notified by the Registrar either in the University calendar or at the beginning of each academic year or otherwise. If a student fails to appear in the final examination of semester, he will not be allowed for registration in the next semester. Such student will repeat the semester when it runs. However, this rule is not applicable for that student who has been permitted for makeup examination by the competent authority.

PREPARATION OF EXAMINATION SCHEDULE:

The Mid-term and Final examination schedule shall be prepared and notified by the Registrar/ Examination Controller/ of the university at least fifteen days before the commencement of the mid –term examination and communicate to the principal of concerning colleges.

SEATING ARRANGEMENT:

The Dean/Principal of the college shall conduct the examination and the respective centre superintendents shall make the proper seating arrangements.

SUPPLY OF EXAMINATION MATERIAL

- Examination materials such as examination papers, answer books, twine, drawing papers, log tables, graph papers etc. will be supplied by the Registrar/ examination controller of the University for Final Theory Examinations.
- Practical Examination Answer Book and Mid – Tern Examination Answer Book will be supplied by the Registrar/ examination controller of the University
- Every student shall be required to bring examination materials such as set squares, scales, pen, pencils, highlighters etc. as he shall not be permitted to borrow any of these materials from fellow students in the examination hall.

APPEARING IN THE FINAL EXAMINATION:

Candidates coming late by more than 30 minutes in the Final Semester examination shall not be allowed to appear in that examination and no examinee shall be allowed to go out of the examination hall for the first 30 minutes.

MAKE-UP EXAMINATION:

In case a student is seriously ill either in the campus and produces a medical certificate from CMO of district has or is hospitalized elsewhere and is unable to attend his examinations, the Registrar may permit him to appear in more than one make-up examination but not more than two make-up examinations during any one Semester.

MID TERM AND FINAL EXAMINATION:

Notification of Mid Term Examination:

Normally no make-up examination shall be permissible in lieu of the missed mid-term or final examination except as permitted by Dean/Registrar of the university.

- If a student fails to appear in any mid-term examination for reasons beyond his/her control, he/she must file an application on the day on which the examination is missed.
- As far as possible, make-up examination shall be discouraged, only in extremely genuine cases like hospitalization; a student can be permitted by the Dean/Registrar to appear at the make-up examination in the mid-term examinations.
- Dean/Registrar is empowered to allow a student for make-up only in mid-term examination, if he/she fulfills the requirements.

Note: The Student can be permitted to appear at the make-up examination only in extremely genuine cases, on the following grounds:

Case – I - If he/she is seriously ill.

Case – II - If he/she has taken leave on account of the death of his mother, brother, sister, spouse, child or grandparent.

Case – III - Any other genuine cause with which the Dean/Registrar is satisfied. Such cases should be reported to the Registrar.

Case – IV - Only one make-up examination will be permissible during a semester but not more than two.

About The Application for Makeup Examination

- The application for make-up examination must be supported by medical certificate either from the CMO or from the hospital concerned and should be routed through **Advisor/Principal**.
- No application for make-up examination shall be considered if received after one week from the expiry of the last date of mid-term examination.
- Make-up examination must be completed within one week from the date of grant of permission by the Dean. It will be the responsibility of the student to get in touch with his/her teacher and have a date fixed for the make-up examination after necessary permission is granted.
- Result of make-up examination will count along with the previous performance of the student during the term for awarding the final grade in course concerned.

Rules & Regulations About passing of semester / promotion of semester / repetition of course / repetition of semester

- To attain the final degree a student has to pass all the courses of each semester.
- The minimum **Grade Point Average (G.P.A.)** and **Over All Grade Point Average (O.G.P.A.)** for passing / promotion of a particular semester as well as degree course should not less than 5.00.
- If a student fails in more than four papers in a particular semester he/she will not be promoted in the next semester but he / she failed in **Four papers** paper in a semester and should secure at least **Grade Point Average (G.P.A.)** of **5.00**, he/ she will be promoted from that semester to the next semester.

- If a student fails in course/ courses he/she will get **four opportunities to pass the course/courses** in consecutive years of that semester. (**course of ODD semester in consecutive ODD SEMESTER similarly course of EVEN SEMESTER in consecutive EVEN SEMESTER**)
- In special case or cases Vice-Chancellor will have to right to allow the separate examination schedule to clear the repeated course/courses for individual or group of individuals.

Note:

In the case of National calamities or Pandemic disorder the semester promotion will be done according to norms of Central Government / State Government/ V.B.S. Purvanchal University, Jaunpur, U.P., India.

Restriction for students going out on educational tours and extra-curricular activities:

The educational tours and extra curricula activities may be organized in such a way not to disturb the academic programme particularly the final examination. As for as possible such programmes should be organized during semester break.

15. RULES AND REGULATIONS ABOUT IMPROVEMENT OF GPA / OGPA:

- Students will be able to improve their **GPA /OGPA** through improvement examination in consecutive semesters (**course of ODD semester in consecutive ODD SEMESTER similarly course of EVEN SEMESTER in consecutive EVEN SEMESTER**). The number of course / courses in each semester shall be decided by competent committee of university.
- It shall be mandatory to fill up the course / courses offered by student in semester examination form for improvement examination with appropriate fees already decided by university.

16. SCRUTINY:

- Scrutiny means totaling of marks and evaluation of questions left unmarked.
- If any student desires scrutiny in any course, he shall be permitted to do so with a prescribed scrutiny fee per course.
- He/she shall have to file an application on the prescribed form which can be obtained from the office of the Registrar within a period of 7 days from the date of registration in the semester, failing which no such applications shall be entertained.
- After having the approval of the Registrar, he/she will present the form to the controller of examination.
- The answer book shall be scrutinized by the examiner concerned in collaboration with Dean faculty of Agriculture.
- The result of scrutiny shall be intimated to the controller of examination /Registrar as soon as possible but in no case later those three weeks from the date of registration.
- The result of the scrutiny by the examiner shall be final.

CHANGE OF GRADE AS A RESULT OF SCRUTINY:

After the grade has been revised as a result of scrutiny, the instructor will send the grade through his/her Incharge of the Department to the Registrar/the Dean.

16. USE OF UNFAIR MEANS (UFM):

- (1) The terms “use of unfair means in the examination” or “attempt to use unfair means in the examination” shall denote the items prescribed by the Academic Council, through its resolution, from time to time. The following items are included in this category-
 - (a) Possession of any books, notes, chits, or such other material and also any notes or signs written on any part of the body, furniture or any other material pertaining to the subject matter of the examination in the examination hall during the examination hours.
 - (b) Talking, whispering or signaling in any form in the examination hall or outside the examination hall during the examination hours.
 - (c) Copying or allowing to copy.
 - (d) Any other activity which may give undue advantage in the examination to any student.
 - (e) Any attempt to use any other means, which in the opinion of the Superintendent of examination may be considered to be unfair.
- (2) **Unfair means in examination:** The Dean/Principal of the college in which the student is registered shall be responsible for dealing with all the cases of use of unfair means in the semester test and examinations. In this matter, a Committee consisting of the Dean and two professors/Instructors of the College shall assist the Dean. This Committee shall be constituted by Vice Chancellor every year. The committee shall take appropriate action after effecting full opportunity to the student for his defense and the penalty will be as indicated below.
 - (a) A student if found using unfair during mid-term examination, he will be awarded zero in mid-term examination.
 - (b) A student found unfair means during the final examination shall be punished as under-
 - (i) If the material found with the student is related with the course and the student has not used it, he would be awarded ‘F’ grade in that course.
 - (ii) If the student has used the material found with the student he will be awarded ‘F’ grade in all the courses in the semester.
 - (iii) A student found to appear in the examination in place of another student would be treated under unfair means. Such student will be summarily expelled from the University.
 - (c) If a student repeats the offence more than twice, during a particular degree programme, he will be disqualified for being a student in this University and shall be immediately removed from College.
- (3) The instructor/invigilators concerned shall report to the Dean/Principal through the Head of the Department/Principal/Superintendent of Examinations on the day of occurrence of cases of unfair means with full details of the evidence and/ or exhibits. An explanation of the student concerned, if possible, shall also be submitted.

Note :

Just after announcement of results, the Register will communicate to the students, who have obtained ‘F’ grade in their report card / marksheat as carry over

17. REPETITIONS OF COURSES:

- If a student secures 'F' grade, he/she shall be repeat the course whenever the university offers it. The repeated course/courses shall be clear in next consecutive semester/ semesters. (repeated course/ courses of odd semester in odd / of even semester in even semester examination.)
- In case a student obtains 'F' grade in a course and repeats it, the grade secured by the student on repeating the course shall be reflected in the grade report.
- To clear the repeated course, student shall submit their repeated course / courses (carry over papers) in the examination form with payment of prescribed additional fee as per Improvement Examination rules of University.
- Just after announcement of results, the Register will communicate to the students, who have obtained 'F' grade in their report card / marksheat as carry over.

FORMAT OF SEMESTER REPORT CARD OF SEMESTERS

PROGRESS REPORT CARD



MSI

वीर बहादुर सिंह पूर्वांचल विश्वविद्यालय
जौनपुर, उ. प्र. भारत, पिन : २२२००३



Veer Bahadur Singh Purvanchal University **Jaunpur, U.P. India. Pin : 222003**

SEMESTER REPORT CARD

B. Sc. (Hons.) Agriculture

FIRST/----- SEMESTER EXAMINATION : Session

Name :-----
Father's Name :-----
Mother's Name :-----
Husband,s Name :-----
Name of College :-----

Roll Number :-----
Category :Regular/ Private
Enrollment Number :

Sl.No.	Course Code	Title of Courses	Credit Hours	Marks Obtained	Grade Points	Total Grade Points
1						
2						
3						
4						
Total						

RESULT : PASSED / PROMOTED / FAILED
CARRY-OVER COURSECODE :

TOTAL GRADE POINTS :
GRADE POINTS AVERAGE:
(G.P.A.)

Date :

BAR CODE :

Checked By : 1. Signature
Full Name

2. Signature
Full Name

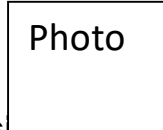
(Name & Signature of Examination Controller)

Final Semester (TRANSCRIPT)



MSI

वीर बहादुर सिंह पूर्वांचल विश्वविद्यालय
जौनपुर, उ. प्र. भारत, पिन : २२२००३



Veer Bahadur Singh Purvanchal University
Jaunpur, U.P. India. Pin : 222003

Name : Roll Number : SEMESTER

REPORT CARD

B. Sc. (Hons.) Agriculture

FINAL SEMESTER EXAMINATION & TRANSCRIPT

Session

- A.
B. Father's Name : Category : Regular/ Private
C. Mother's Name : Enrollment Number :
D. Husband,s Name :
E. Name of College :

I- SEMESTER (FULL SEMESTE REPORT)		II-SEMESTER (FULL SEMESTE REPORT)	
III- SEMESTER (FULL SEMESTE REPORT)		IV- SEMESTER (FULL SEMESTE REPORT)	
V-SEMESTER (FULL SEMESTE REPORT)		VI-SEMESTER (FULL SEMESTE REPORT)	
VII- SEMESTER (FULL SEMESTE REPORT)		VIII-SEMESTER (FULL SEMESTE REPORT)	
	Credit Hours	Grade Points	Total Grade Points
Total Up To Last Semester			Cumulative Total Grade Point
Cumulative Up To This Semester			OGPA = Cumulative Credit Hours

RESULT : PASSED / FAILED

TOTAL GRADE POINTS----- :

CARRY-OVER COURSECODE :

OVER ALL GRADE POINTS AVERAGE (O.G.P.A.)-----

Division :

% of marks= OGPA x 10=

Date :

BAR CODE :

12. Punishment awarded to students shall invariably be recorded in their personnel record for future reference and will be taken into consideration, if necessary, while awarding certificate of conduct on leaving the University.
13. Students are expected to maintain a high standard of discipline on the campus.

The following are the detailed outlines of student's indiscipline:

- Disregard of college/hostel rules, orders & notices.
 - Disregard of orders and instructions of the member of college staff.
 - Noisy, boisterous, disorderly and obnoxious behavior with fellow students and staffs.
 - Ragging of junior students, which are strictly banned.
 - Irregular attendance and unauthorized absence from classes and hostels.
 - Lack of punctuality in attendance and in payment of college dues.
 - Recourse to unfair means in tests and examinations.
 - Recourse to false or fraudulent statements or acts.
 - Keeping, carrying and supplying of any fire arms, lethal weapons, knife with a blade of more than 4” in the room or outside.
 - Keeping, using, or supplying intoxicants in any form.
 - Gambling in any form.
 - Demonstration in any form including processions and meeting, except student union election.
 - Strike or hunger strike.
 - Boycotting of a University function, programme or activity.
 - Abusing.
 - Recourse to violence, intimidation, riots.
 - Any breach of law of the Country of the State, Act, Statues, Regulations or Rules of the University or orders of a competent authority.
 - Disturbing other students in their studies.
 - Damaging any University property/College property.
 - Failure to produce identify card on demand by a member of staff, warden etc. in and outside the campus at any time and place within the college, hostel and town.
 - Gainful paid employment adversely affecting the studies.
 - Un-sportsman like behavior in indoors and outdoors games.
 - Any act specifically forbidden by the wardens, Dean, D.S.W. or any officer of the University.
14. Students(s) who has/have committed any cat or indiscipline is liable to any one or more of the following punishments.
 - Warning.
 - Reduction/Cancellation of scholarship/stipend/fellowship.
 - Fine.
 - Recovery in part of full of losses or damages to the college property or property of others caused by the students.
 - Suspension from availing any of the college amenities and services or from class.
 - Removal, rustication or expulsion from the college, hostel or university.

15. Any student who violates any regulation or otherwise indulges in any act of indiscipline as defined may be fined up to Rs. 100/- by the warden of the hostel if the warden is satisfied that the fine is adequate, punishment for the act of indiscipline.
16. Cases of indiscipline, which in the opinion of the proctors of college/principal of the college are so serious that a fine of Rs.100/-or less would not be sufficient, punishment shall be referred by the wardens to Dean/D.S.W. principal for taking disciplinary action against the students. board or a committee proctors consisting of all wardens proctors of the college may fine up to Rs.1500/-and this shall be noted on the students' permanent record card but shall not go necessarily on the character certificate. In addition, the student may also be placed on conduct probation. This will include an official warning to student that one more incident of indiscipline might lead to the dismissal of the student from the University. Any student during this period when he/she is on conduct probation will not be entitled for any financial aid and shall not represent university/college or anywhere.
17. On the basis of complaint(s) received against any student, if the Dean/principal is convinced, pending enquiry and final orders, the alleged/involved student(S) may also be placed on conduct probation.
18. Cases of more serious indiscipline shall be forwarded to the Vice-chancellor who on the recommendation of the disciplinary committee shall award adequate punishment.(s).
19. Students found directly or indirectly involved in ragging of newly admitted students inside or outside the campus will summarily be expelled from the college/university.
20. For indiscipline on playground, games president may fine students(s) up to Rs.100/-each and/ or debar a student from game (s) for up to two semesters/one session. For debarring, approval of Dean Students Welfare/ Principal will have to be obtained.

READMISSION BY SUSPENSION OF PUNISHMENT SHALL INVARIABLY BE SUBJECT TO THE FOLLOWING CONDITIONS:

1. The student concerned will be re-admitted not as a matter of right but only on compassionate ground, on the submission of an unconditional apology
2. He/she will remain on conduct probation during the remaining period of his/her stay in the University.
3. He/she will furnish a bond of good behavior as prescribed, duly countersigned by his/her parent/guardian, which should remain operative for the entire period of his stay in the college or university.
4. He/she will not apply nor will be entitled to admission to any new degree programme in the University/College.
5. If the student concerned has been permanently dismissed, he/she will be entitled to apply for relief under this regulation only after the expiry of two semester/one session from the date of orders of punishment, but in no case will be entitled to readmission before the expiry of less than four semesters/two sessions from the effective date of punishment.
6. No Student shall be eligible for seeking relief under this regulation unless he has completed at least two semesters/one session satisfactorily in college/University prior to being awarded the punishment of permanent dismissal.

7. No student shall be eligible to seek or be granted relief under the regulation if he/she commits any act of indiscipline in the college/university campus or misbehaves with any officer or teacher of the College/University within campus or outside during the period laid down in clause(5) above:

HOSTEL RULES:

1. Allotment of hostel rooms to the students will be entirely the discretion of the wardens. The warden may change the allotment as and when they think necessary to do so. No change from one room to another or the partnership shall be allowed except under special circumstances by prior written approval of the warden.
2. After a student is admitted to the College/University, it is compulsory for him to reside in the hostel maintained or recognized by the University except those living either with their parents or guardians within or outside University campus. Such students who do not want to reside in the hostel from the D.S.W./Dean must obtain written permission. On being admitted to the University, a student has to deposit a sum of Rs. 200/- payable in two installments or Rs. 100/- each to be paid at the time of registration of first two semester besides other dues, which shall be refundable to him/her when he/she vacates the hostel after clearing the dues.
3. The Dean/D.S.W./Warden of the hostels reserve the right to refuse admission in the hostels without assigning any reason to a student who's living in the hostel is considered pre judicial to the general discipline in the hostels.
4. The warden or any other official of the University competent or deputed shall open all the rooms in the hostel for inspection for the purpose at any time.
5. When required by the wardens for specific reasons, the student residents shall vacate the room temporarily or otherwise. In case of refusal, the wardens shall have power break open the room and get the room vacated.
6. The students must be present in their rooms at the time of roll call, which be taken every night between 9.30 and 10.00 P.M. by the prefects who will be appointed by the wardens. Any student found absent without permission is liable to fine up to 5/- per night of absence and/or disciplinary action. The cashier would realize the fine as fees on the report of the warden. Guardians of the students or the respective State Governments, as the case may be, will be informed. If unauthorized absence exceeded 15 days, the allotment of the room will be cancelled and hostel room rent will be forfeited.
7. When the warden finds a student frequently out during night without permission, he/she will, apart from imposing the usual fines, issue a warning to him/her if the warning has no effect on the students, Dean/D.S.W. on the recommendation of the warden may expel the student from the hostel or may take such other disciplinary action as he deems proper.
8. Before leaving the hostel for the night or for the holidays excluding semester breaks and summer vacations, the student must obtain prior permission of the warden on prescribed hostel permit slips.
9. No student shall quarrel or misbehave with any fellow student or employee of the hostel including dhobi, barber, chowkidar, sweeper, servant, maintenance staff, mess worker and cook etc. Any misbehavior on the part of the employees or fellow students shall be brought to the notice of the warden and the concerned student is liable to disciplinary action.

10. No meeting shall be held within the premises of the hostel without the prior permission of the warden. Disciplinary action will be taken against students who organize or attend such unauthorized meetings, except student's union election, outside of hostel.
11. If a student defaces or causes damage to the building, furniture of fitting, the cost or repair or replacement shall be recovered from him.
12. Friends and relatives of the students may visit them in the hostels during the daytime only. Non-authorized person is allowed to stay at night in the hostel after 10pm. If, however, parents/guardians or other guests of the students have to stay, the students must take permission from D.S.W./Dean on the recommendation of the wardens. This facility will be available in Teacher's/ Farmer's guesthouse University/ College accommodation. If any for a period of maximum of three days only.
13. No guests of opposite sex are allowed to stay or visit the hostel at any time under any circumstances.
14. Students shall not shift fittings assigned to the rooms. When leaving for vacation, these must be handed over to the storekeeper or his/her representative. During the period of allotment of room, the student will be responsible for all property in the room.
15. No fire combustible articles, arms or lethal weapons are allowed to be kept in the hostel.
16. No resident student shall keep in his possession or use intoxicating drugs or liquor of any kind. Gambling or playing cards in any form in the hostel is strictly prohibited.
17. Students are not allowed to have their own recreational appliances viz. radio, transistor, tape recorder/ player, T.V. etc.
18. Students feeling sick should inform the Medical Officer/any officer of the university/college under intimation to the warden.
19. Resident students would observe cleanliness around their surroundings and should keep their rooms neat and tidy.
20. Watchman/security guard of hostels watch and wards of the University/College property. No student in any circumstances should ask the Watchman/security guard to do any other work.
21. Students shall have to take care of their belongings themselves and are advised not keep any costly items with them in the hostel./ any officer of the university/college.
22. No electric point should be left on while locking the room at any time.
23. Students are not permitted to have electric heaters in their rooms. In case any student found in using electric heaters, a penalty of Rs. 1000/- is fined from the concerned student.
24. Cooking in any form is not allowed in the hostel room.

DETAIL SYLLABUS OF COURSES OF DIFFERENT SUBJECTS

Prefix of course Code:

A. Prefix of Course Code with Capital Letters

Prefix is the short form of subject's and it denoted by **Three** capital letters i.e.

AGR	:	Agronomy
GPB	:	Genetics and Plant Breeding
SAC	:	Soil Science and Agricultural Chemistry
AES	:	Agricultural Economics and Statistics
PPA	:	Plant Pathology
ENT	:	Entomology
HOR	:	Horticulture
AGE	:	Agricultural Engineering and Soil Water Conservation
EXT	:	Agricultural Extension and Communication
AHD	:	Animal Husbandry and Dairying

B. Prefix of course Code with Numeral Numbers

The numeral prefix with Tree digits indicates the year, semester and Serial of course of subject in that particular semester e.g.

i.AGR - 111-

(AGR)	:	Agronomy
1	:	Year - I
1	:	Semester - I
1	:	First course of Agronomy in First Semester.

ii.AGR - 112-

(AGR)	:	Agronomy
1	:	Year – I
1	:	Semester – I
2	:	Second course of Agronomy in First Semester

iii.AGR - 352-

(AGR)	:	Agronomy
3	:	Year- III
5	:	Semester – V
2	:	Second course of Agronomy in Fifth Semester

iv.HOR -362 –

(HOR)	:	Horticulture
3	:	Year – III
6	:	Semester- VI
2	:	Second Course of Horticulture in Sixth Semester

Discipline-wise Courses

S.N.	New course Code	Old Course Code	Course title	Credit Hours
1. Agronomy (AGR)				
1	AGR-111	Ag- 106	Fundamentals of Agronomy	4(3+1)
2	AGR-121	Ag- 210	Agricultural Heritage	1(1+0)
3	AGR-231	Ag- 301	Crop Production Technology – I (<i>Kharif</i> crops)	2(1+1)
4	AGR-241	Ag- 401	Crop Production Technology – II (<i>Rabi</i> crops)	2(1+1)
5	AGR-242	Ag- 411	Weed Management (Elective Course)	2(1+1)
6	AGR-351	Ag- 502	Farming System & Sustainable Agriculture	1(1+0)
7	AGR-352	Ag- 507	Practical Crop Production - I (<i>Kharif</i> crops)	2(0+2)
8	AGR-353	Ag-508	Rainfed Agriculture & Watershed Management	2(1+1)
9	AGR-361	Ag- 605	Practical Crop Production - II (<i>Rabi</i> crops)	2(0+2)
10	AGR-362	Ag- 607	Principles of Organic Farming and Precision Farming	2(1+1)
TOTAL				20
2. Genetics and Plant Breeding (GPB)				
1	GPB-111	Ag-102	Fundamentals of Crop Physiology and Taxonomy	3(2+1)
2	GPB-121	Ag-201	Fundamentals of Genetics	3(2+1)
3	GPB-122	Ag- 206	Environmental Studies and Disaster Management	3(2+1)
4	GPB-231	Ag- 302	Fundamentals of Plant Breeding	3(2+1)
5	GPB-241	Ag- 405	Fundamentals of Biotechnology	2(1+1)
6	GPB-351	Ag- 504	Crop Improvement-I (<i>Kharif</i> crops)	2(1+1)
7	GPB-361	Ag-604	Crop Improvement-II (<i>Rabi</i> crops)	2(1+1)
8	GPB-362	Ag- 606	Principles of Seed Technology	3(2+1)
9	GPB-363	Ag- 610	Intellectual Property Rights	1(1+0)
10	GPB-364	Ag- 612	Commercial Plant Breeding (Elective)	3(1+2)
TOTAL				25
3. Soil Science and Agricultural Chemistry (SAC)				
1	SAC-111	Ag-103	Fundamentals of Soil Science	3(2+1)
2	SAC-121	Ag-203	Manures, Fertilizers and Soil Fertility Management	3(2+1)
3	SAC-231	Ag- 305	Fundamentals of Plant Biochemistry	3(2+1)
4	SAC-241	Ag- 404	Problematic soils and their Management	2(1+1)
5	SAC-242	Ag- 408	Agricultural Microbiology	2(1+1)
6	SAC-243	Ag- 411	Bio-pesticides and Bio-fertilizers(Elective)	3(2+1)
7	SAC-351	Ag- 506	Geo-informatics and Nanotechnology	2(1+1)
8	SAC-352	Ag- 512	Agrochemicals (Elective)	3(2+1)
TOTAL				21
4. Agricultural Economics and Statistics (AES)				
1	AES-111	Ag-108	Fundamentals of Agricultural Economics	2(1+1)
2	AES-121	Ag-209	Agri- Informatics and Computer Application	3(2+1)

3	AES-231	Ag- 303	Statistical Methods	2(1+1)
4	AES-232	Ag- 306	Agricultural Finance and Co-Operation	3(2+1)
5	AES-241	Ag- 406	Agricultural Marketing Trade & Prices	3(2+1)
6	AES-351	Ag- 511	Farm Management, Production & Resource Economics	3(2+1)
7	AES-361	Ag-611	Agribusiness Management	3(2+1)
----	AES-112	-----	Elementary Mathematics (Elective) **	2(2+0)
TOTAL				19+2=21
5. Plant Pathology (PPA)				
1	PPA-121	Ag- 204	Fundamentals of Plant Pathology	4(3+1)
2	PPA-231	Ag-309	Diseases of Field and Horticultural Crops and their Management-I	3(2+1)
3	PPA-241	Ag- 410	Diseases of Field and Horticultural Crops and their Management-II	3(2+1)
4	PPA-351	Ag- 501	Principles of Integrated Pest and Disease Management	3(2+1)
TOTAL				=13
6. Entomology (ENT)				
1	ENT-111	Ag- 101	Fundamentals of Entomology	3(2+1)
2	ENT-231	Ag-310	Insect Systematic and IPM	2(1+1)
3	ENT-351	Ag- 503	Pests of Crops and Stored Grain and their Management	3(2+1)
4	ENT-361	Ag- 603	Management of Beneficial Insects	2(1+1)
-----	ENT- 112	-----	Elementary Biology (Elective) **	2(1+1)
TOTAL				10+2=12
7. Horticulture (HOR)				
1	HOR-121	Ag- 205	Fundamentals of Horticulture	3(2+1)
2	HOR-231	Ag- 304	Production Technology for Fruit and Plantation Crops	2(1+1)
3	HOR-241	Ag-402	Production Technology for Vegetables and Spices	2(1+1)
4	HOR-242	Ag- 412	Hi-tech Horticulture	3(2+1)
5	HOR-351	Ag- 510	Production Technology for Ornamental Crops, MAP and Landscaping	2(1+1)
6	HOR-352	Ag- 512	Micro Propagation Technology (Elective)	3(2+1)
7	HOR-361	Ag- 608	Post-harvest Management and Value Addition of Fruits and Vegetables	3(2+1)
8	HOR-362	Ag- 612	Landscaping (Elective)	3(2+1)
TOTAL				21
8. Agricultural Engineering and Soil Conservation (AGE)				
1	AGE-111	Ag-104	Introductory Agro-meteorology & Climate Change	2(1+1)
2	AGE- 112	Ag- 109	Farm Machinery and Power	3(2+1)
3	AGE-121	Ag-202	Introductory Soil and Water Conservation	3(2+1)
4	AGE-241	Ag- 403	Renewable Energy and Green Technology	2(1+1)
5	AGE-351	Ag- 512	System Simulation and Agro advisory (Elective Course)	3(2+1)
6	AGE-361	Ag-601	Introduction to Forestry	3(2+1)
7	AGE-362	Ag-602	Protected Cultivation and Secondary Agriculture	2(1+1)
TOTAL				18
9. Agricultural Extension and Communication (EXT)				
1	EXT-111	Ag- 105	Comprehension & Communication Skills in English	2(2+0)
2	EXT-112	Ag-110	Human Values and Ethics (non gradial)**	1(1=0)**
3	EXT-121	Ag-207	Fundamentals of Agricultural Extension Education	3(2+1)
4	EXT-231	Ag- 307	Communication Skills and Personality Development	2(1+1)
5	EXT-241	Ag- 407	Rural Sociology & Educational Psychology	2(2+0)
6	EXT-351	Ag- 505	Entrepreneurship Development and Business Communication	2(1+1)

7	EXT-361	Ag- 612	Agricultural Journalism (Elective)	3(2+1)
TOTAL				14
10. Animal Husbandry and Dairying (AHD)				
1	AHD-111	Ag- 107	Introductory Animal Husbandry	2(1+1)
2	AHD-121	Ag- 208	Livestock , Production and Management	3(2+1)
3	AHD-231	Ag- 308	Dairy Technology	3 (2+1)
4	AHD-241	Ag- 409	Principles of Food Science and Nutrition	2(1+1)
5	AHD-351	Ag- 509	Poultry Production and Management	3(2+1)
6	AHD-361	Ag-609	Food Safety and Standards (Elective)	3(2+1)
TOTAL				16
SOME COURSES WILL BE CONDUCTED BY				
	NSS/NCC/Rovers & Rangers/Physical Education & Yoga Practices 1-N.S.S./N.C.C./ Rovers & Rangers 2-Department of Physical Education / Games			2(0+2)
	Comprehension & Communication Skills in English 1-Department of English 2-Department of Agriculture Extension			2(2+0)
	Educational Tour organized by faculty members during semester break between IV & V Semester or VI & VII Semester.			2(0+2)

SEMESTER WISE DISTRIBUTION OF CORSES B.Sc (Hons.)-Agriculture

I- Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	ENT-111	Ag -101	Fundamentals of Entomology	3(2+1)
2	GPB-111	Ag -102	Fundamentals of Crop Physiology and Taxonomy	3(2+1)
3	SAC-111	Ag -103	Fundamentals of Soil Science	3(2+1)
4	AGE-111	Ag -104	Introductory Agro-meteorology & Climate Change	2(1+1)
5	EXT-111	Ag -105	Comprehension & Communication Skills in English	2(2+0)
6	AGR-111	Ag -106	Fundamentals of Agronomy	4(3+1)
7	AHD-111	Ag -107	Introductory Animal Husbandry	2(1+1)
8	AES-111	Ag -108	Fundamentals of Agricultural Economics	2(1+1)
9	AGE-112	Ag -109	Farm Machinery and Power	3(2+1)
10	EXT-112	Ag -110	Human Values & Ethics (non-gradual) **	1(1+0) **
****	AES-112 / ENT-112	Ag- 111	Elementary Mathematics (Elective) ** 2(2+0) Elementary Biology (Elective) ** 2(1+1)	2**
12	NPY-112	Ag -112	NSS/NCC/Rovers & rangers/Physical Education & Yoga Practices** (Only one course offered by student)	2(0+2) **

**Non-gradual course

TOTAL- 24 +5= 29

II Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	GPB-121	Ag -201	Fundamentals of Genetics	3(2+1)
2	AGE-121	Ag -202	Soil and Water Conservation	3(2+1)
3	SAC-121	Ag -203	Manures, Fertilizers and Soil Fertility Management	3(2+1)
4	PPA-121	Ag -204	Fundamentals of Plant Pathology	4(3+1)
5	HOR-121	Ag -205	Fundamentals of Horticulture	3(2+1)
6	GPB-122	Ag -206	Environmental Studies and Disaster Management	3(2+1)
7	EXT-121	Ag -207	Fundamentals of Agricultural Extension Education	3(2+1)
8	ADH-121	Ag -208	Livestock Production and Management	3(2+1)

9	AES-121	Ag -209	Agri-informatics and Computer Application	3(2+1)
10	AGR-121	Ag -210	Agricultural Heritage**	1(1+0)**

TOTAL 28+1=29

III Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	AGR-231	Ag -301	Crop Production technology-I (Kharif crops)	2(1+1)
2	GPB-231	Ag -302	Fundamentals of Plant Breeding	3(2+1)
3	AES-231	Ag -303	Statistical Methods	2(1+1)
4	HOR-231	Ag -304	Production Technology Fruits and Plantation Crops	2(1+1)
5	SAC-231	Ag -305	Fundamentals of Plant Biochemistry	3(2+1)
6	AES-232	Ag -306	Agricultural Finance and Cooperation	3(2+1)
7	EXT-231	Ag -307	Communication Skills and Personality Development	2(1+1)
8	AHD-231	Ag -308	Dairy Technology	3(2+1)
9	PPA-231	Ag -309	Diseases of Field and Horticultural Crops and their Management-I	3(2+1)
10	ENT-231	Ag -310	Insect Systematics and IPM	2(1+1)

TOTAL 25

IV Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	AGR-241	Ag -401	Crop Production Technology –II (<i>Rabi Crops</i>)	2(1+1)
2	HOR-241	Ag -402	Production Technology of Vegetables and Spices	2(1+1)
3	AGE-241	Ag -403	Renewable Energy and Green Technology	2(1+1)
4	SAC-241	Ag -404	Problematic Soils and their Management	2(1+1)
5	GPB-241	Ag -405	Biotechnology	2(1+1)
6	AES-241	Ag -406	Agricultural Marketing Trade and Prices	3(2+1)
7	EXT-241	Ag -407	Rural Sociology and Educational Psychology	2(1+1)
8	SAC-242	Ag -408	Agricultural Microbiology	2(1+1)
9	AHD-241	Ag -409	Principles of Food Science and Nutrition	2(1+1)
10	PPA- 241	Ag -410	Diseases of Field & Horticultural Crops and their Management–II	3(2+1)
11	HOR-242	Ag- 412	High-tech-horticulture	3(2+1)
12	SAC-243 / AGR-242	Ag – 411	Elective Course-/Biopesticides and Biofertilizers Weed Management (Only one course offered by student)	3(2+1) 2(1+1)
13	STUDY TOUR	Ag - 413	Educational Tour (Compulsory)	2(0+2)

TOTAL 29 or 30

Note: Educational tour will be conducted by faculty members during break between IV & V Semester or VI & VII Semester

V Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	PPA- 351	Ag -501	Principles of Integrated Pest and Disease Management	3(2+1)
2	AGR-351	Ag -502	Farming System & Sustainable Agriculture	1(1+0)
3	ENT-351	Ag -503	Pests of Crops and Stored Grain and their Management	3(2+1)
4	GPB-351	Ag -504	Crop Improvement-I (<i>Kharif Crops</i>)	2(1+1)
5	EXT-351	Ag -505	Entrepreneurship Development and Business Communication	2(1+1)
6	SAC-351	Ag -506	Geoinformatics and Nano-technology	2(1+1)
7	AGR-352	Ag -507	Practical Crop Production – I (<i>Kharif</i> crops)	2(0+2)
8	AGR-353	Ag -508	Rainfed Agriculture & Watershed Management	2(1+1)
9	AHD-351	Ag -509	Poultry Production and Management	3(2+1)

10	HOR-351	Ag -510	Production Technology for Ornamental Crops, MAP and Landscaping	2(1+1)
11	AES-351	Ag -511	Farm Management, Production and Resource Economics	3(2+1)
12	SAC-352 / AGE-351/ HOR-352	Ag -512/ Ag-512/ Ag-512	Elective Course-Agrochemicals/System Simulation and Agro-advisory/ Micro Propagation Technolog (Only one course offered by student)	3(2+1)

TOTAL 28

VI Semester

<u>S.N.</u>	<u>New Course Code</u>	<u>Old Course Code</u>	<u>Title of the Course</u>	<u>Credit</u>
1	AGE-361	Ag -601	Introduction to Forestry	3(2+1)
2	AGE-362	Ag -602	Protected Cultivation and Secondary Agriculture	2(1+1)
3	ENT-361	Ag -603	Management of Beneficial Insects	2(1+1)
4	GPB-361	Ag -604	Crop Improvement-II (<i>Rabi crops</i>)	2(1+1)
5	AGR-361	Ag -605	Practical Crop Production –II (<i>Rabi crops</i>)	2(0+2)
6	GPB-362	Ag -606	Principles of Seed Technology	3(2+1)
7	AGR-362	Ag -607	Principles of Organic Farming and Precision farming	2(1+1)
8	HOR-361	Ag -608	Post-harvest Management & Value Addition of Fruits & Vegetables	2(1+1)
9	AHD-361	Ag -609	Food Safety and Standard	3(2+1)
10	GPB-363	Ag -610	Intellectual Property Rights	1(1+0)
11	AES-361	Ag -611	Agribusiness Management	3(2+1)
12	EXT-361/ GPB-364/ HOR-362	Ag -612/ Ag- 612/ Ag- 612	Elective Course-Agriculture Journalism/Commercial Plant Breeding/Landscaping (Only one course offered by student)	3(2+1)

Total 28

VII Semester

Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE & AIA)			
S.NO	Activities	Number of weeks	Credit Hours
1	General orientation & On campus training by different faculties	01	14
2	Village attachment	08	
	Unit attachment in Univ./ College. KVK/ Research Station Attachment	05	
3	Plant clinic	0	02
	Agro-Industrial Attachment	03	04
4	Project Report Preparation, Presentation and Evaluation	01	
	Total week of RAWE and AIA	20	20

Agro- Industrial Attachment:

The students would be attached with the agro-industries for a period of **3 weeks** to get an experience of the industrial environment and working.

RAWE Component-I

Village Attachment Training Programme

S.No.	Activity	Duration
1	Orientation and Survey of Village	1 week
2	Agronomical Interventions	1 week
3	Plant Protection Interventions	1 week
4	Soil Improvement Interventions(Soil sampling and testing)	1 week
5	Fruit and Vegetable production interventions	1 week
6	Food Processing and Storage interventions	1 week
7	Animal Production Interventions	1 week

8	Extension and Transfer of Technology activities	1 week
---	---	--------

RAWE Component –II

Agro Industrial Attachment

- Students shall be placed in Agro-and Cottage industries and Commodities Boards for 03 weeks
- Industries include Seed/Sapling production, Pesticides-insecticides, Postharvest-processing value addition, Agri-finance institutions, etc.

Activities and Tasks during Agro-Industrial Attachment Programme

- Acquaintance with industry and staff
- Study of structure, functioning, objective and mandates of the industry
- Study of various processing units and hands-on trainings under supervision of industry staff
- Ethics of industry
- Employment generated by the industry
- Contribution of the industry promoting environment
- Learning business network including outlets of the industry
- Skill development in all crucial tasks of the industry
- Documentation of the activities and task performed by the students
- Performance evaluation, appraisal and ranking of students

Modules for Skill Development and Entrepreneurship: A student has to register 20 credits opting for two modules of (0+10) credits each (total 20 credits) from the package of modules in the ---

VIII semester.

Sl. No.	Title of the module	Credits
1	Production Technology for Bio-agents and Biofertilizer	0+10
2	Seed Production and Technology	0+10
3	Mushroom Cultivation Technology	0+10
4	Soil, Plant, Water and Seed Testing	0+10
5	Commercial Beekeeping	0+10
6	Poultry Production Technology	0+10
7	Commercial Horticulture	0+10
8	Floriculture and Landscaping	0+10
9	Food Processing	0+10
10	Agriculture Waste Management	0+10
11	Organic Production Technology	0+10
12	Commercial Sericulture	0+10

Note: In addition to above ELP modules other important modules may be given to the students by SAUs/University/College

Evaluation of Experiential Learning Programme/ HOT

S.No.	Parameters	Maximum Marks
1	Project Planning and Writing	10
2	Presentation	10
3	Regularity	10
4	Monthly Assessment	10
5	Output delivery	10

6	Technical Skill Development	10
7	Entrepreneurship Skills	10
8	Business networking skills	10
9	Report Writing Skills	10
10	Final Presentation	10
	Total	100

Discipline-wise summary of credit hours

S.N. Group Credits

1 Agronomy	:	20
2 Genetics & Plant Breeding	:	25
3 Soil Science & Agricultural Chemistry		21
4 Entomology		12
5 Agricultural Economics and Statistics		21
6. Agricultural Engineering and Soil & Water conservation		18
7.Plant Pathology		13
8. Horticulture		18
9. Agricultural Extension		14
10. Animal Production-Animal Husbandry and Dairying		17

S.N. Group

Credits

11 English	
12 Remedial Courses (Elementary Biology or Mathematics)	
13 NSS/NCC/Rovers & Rangers/Physical Education & Yoga Practices	
14 Human Values and Ethics	
15 Educational Tour	

**Total 179 credit selective
20 +20**

RAWE

ELP

Grand Total = 179+20+20=219

NEW COURSES

Sl. No. Course Title

1. Geo-informatics and Nanotechnology
2. Rainfed Agriculture and Watershed Management
3. Problematic Soils and their Management
4. Renewable Energy and Green Technology
5. Management of Beneficial Insects
6. Fundamentals of Horticulture
7. Introduction to Forestry
8. Agri- Informatics
9. Intellectual Property Rights
10. Principles of Food Science & Technology
11. Communication Skills and Personality Development
12. Principles of Integrated Pest & Diseases Management
13. Agricultural Heritage
14. Introductory Biology
15. Elementary Mathematics
16. Human Values & Ethics (NG)

*

* Non-gradual courses

Elective Courses: A student can select three elective courses out of the following and offer during 4th, 5th and 6th semesters.

S.N.	Courses	Credit Hours
8.	Agrochemicals	3(2+1)
9.	Commercial Plant Breeding	3(1+2)
10.	Landscaping	3(2+1)
11.	Biopesticides and Biofertilizers	3(2+1)
12.	Weed Management	3(2+1)
13.	System Simulation and Agro-advisory	3(2+1)
14.	Agricultural Journalism	3(2+1)

1. Agronomy

S.N.	New course Code	Course title	Credit Hours
1	AGR-111	Fundamentals of Agronomy	4(3+1)
2	AGR-121	Agricultural Heritage	1(1+0)
3	AGR-231	Crop Production Technology – I (<i>Kharif</i> crops)	2(1+1)
4	AGR-241	Crop Production Technology – II (<i>Rabi</i> crops)	2(1+1)
5	AGR-242	Weed Management (Elective Course)	2(1+1)
6	AGR-351	Farming System & Sustainable Agriculture	1(1+0)
7	AGR-352	Practical Crop Production - I (<i>Kharif</i> crops)	2(0+2)
8	AGR-353	Rainfed Agriculture & Watershed Management	2(1+1)
9	AGR-361	Practical Crop Production - II (<i>Rabi</i> crops)	2(0+2)
10	AGR-362	Principles of Organic Farming and Precision Farming	2(1+1)
Total-20			

1. AGR-111: Fundamentals of Agronomy

4(3+1)

Theory

Agronomy and its scope, seeds and sowing, tillage and tith, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources, soil-plant-water relationship, crop water requirement, water use efficiency, irrigation- scheduling criteria and methods, quality of irrigation water, waterlogging. Weeds- importance, classification, crop-weed competition, concepts of weed management, principles and methods, herbicides- classification, selectivity and resistance, allelopathy. Growth and development of crops, factors affecting growth and development, plant ideotypes, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Practical

Identification of crops, seeds, fertilizers, pesticides and tillage implements, study of agro-climatic zones of India, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill.

2 .AGR-121:Agricultural Heritage

1(1+0)

Theory

Introduction of Indian agricultural heritage; Ancient agricultural practices, Relevance of heritage to present day agriculture; Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern era; Plant production and protection through indigenous traditional knowledge; Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in

India; Crop significance and classifications; National agriculture setup in India; Current scenario of Indian agriculture; Indian agricultural concerns and future prospects.

3. AGR-231: Crop Production Technology-I (Kharif Crops)

2(1+1)

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Kharif* crops. Cereals – rice, maize, sorghum, pearl millet and finger millet, Pulses-pigeonpea, mungbean and urd-bean; Oilseeds- groundnut and soybean; Fibre crops- cotton & jute; Forage crops-sorghum, cowpea, cluster bean and napier.

Practical

Rice nursery preparation, transplanting of rice, sowing of soybean, pigeonpea and mungbean. maize, groundnut and cotton, effect of seed size on germination and seedling vigour of *kharif* season crops, effect of sowing depth on germination of *kharif* crops, identification of weeds in *kharif* season crops, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation of *kharif* season crops, study of crop varieties and important agronomic experiments at experimental farm. Study of forage experiments, morphological description of *kharif* season crops, visit to research centres of related crops.

4. AGR-241: Crop Production Technology-II (Rabi crops)

2(1+1)

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Rabi* crops; Cereals –wheat and barley, Pulses-chickpea, lentil, peas, Oilseeds-rape seed & mustard and sunflower; Sugar crops-sugarcane; Medicinal and Aromatic crops-mentha, lemon grass and citronella, Forage crops-berseem, lucerne and oat.

Practical

Sowing methods of wheat and sugarcane, identification of weeds in *rabi* season crops, study of morphological characteristics of *rabi* crops, study of yield contributing characters of *rabi* season crops, yield and juice quality analysis of sugarcane, study of important agronomic experiments of *rabi* crops at experimental farms. Study of *rabi* forage experiments, oil extraction of medicinal & aromatic crops, visit to research stations of related crops.

5. AGR-242: Weed Management (Elective Course)

2(1+1)

Theory

Introduction to weeds, characteristics of weeds, their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds. Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of action of herbicides and selectivity. Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture. Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with agro-chemicals and their application. Integration of herbicides with non chemical methods of weed management. Herbicide Resistance and its management.

Practical

Techniques of weed preservation. Weed identification and their losses study. Biology of important weeds. Study of herbicide formulations and mixture of herbicide. Herbicide and agro chemicals study. Shift of weed- flora study in long term experiments. Study about methods of herbicide application, spraying equipments. Calculations of herbicide doses and weed control efficiency and weed index.

6. AGR-351: Farming System & Sustainable Agriculture

1(1+0)

Theory

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping

system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system; Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.

7. AGR-352: Practical Crop Production-I (*Kharif Crops*) **2(0+2)**

Practical

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests & diseases of *Kharif* crops, harvesting, threshing, winnowing, drying, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balancesheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

8. AGR-353: Rainfed Agriculture & Watershed Management – **2(1+1)**

Theory

Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India; Problems and prospects of rainfed agriculture in India ; Soil and climatic conditions prevalent in rainfed areas; Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation to drought; Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices, Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management, factors affecting watershed management.

Practical

Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons. Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation. Studies on cultural practices for mitigating moisture stress. Characterization and delineation of model watershed. Field demonstration on soil & moisture conservation measures. Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed.

9. AGR-361: Practical Crop Production-II (*Rabi Crops*) **2(0+2)**

Practical

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests & diseases of *Rabi* crops, harvesting, threshing, winnowing, drying, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

10. AGR-362: Principles of Organic Farming and Precision Farming **2(1+1)**

Theory

Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture; Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect ,pest, disease and weed management under organic mode of production; Operational structure of NPOP; Certification process and standards of organic farming; Processing, labeling, economic considerations and viability, marketing and export potential of organic products. Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture.

Practical

Visit of organic farms to study the various components and their utilization; Preparation of enrich compost, vermi-compost, bio-fertilizers/bio-inoculants and their quality analysis; Indigenous technology knowledge (ITK) for nutrient, insect-pest, disease and weed management. Cost of organic production system. Post harvest management, Quality aspect, grading, packaging and handling.

2.Genetics and Plant Breeding

1	GPB-111	Fundamentals of Crop Physiology and Taxonomy	3(2+1)
2	GPB-121	Fundamentals of Genetics	3(2+1)
3	GPB-122	Environmental Studies and Disaster Management	3(2+1)
4	GPB-231	Fundamentals of Plant Breeding	3(2+1)
5	GPB-241	Fundamentals of Biotechnology	2(1+1)
6	GPB-351	Crop Improvement-I (<i>Kharif</i> crops)	2(1+1)
7	GPB-361	Crop Improvement-II (<i>Rabi</i> crops)	2(1+1)
8	GPB-362	Principles of Seed Technology	3(2+1)
9	GPB-363	Intellectual Property Rights	1(1+0)
10	GPB-364	Commercial Plant Breeding (Elective)	3(1+2)
Total - 25			

1. GPB-111: Fundamentals of Crop Physiology and Taxonomy

3(2+1)

Theory

Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview; tissue systems and its importance; Diffusion and osmosis; Absorption of water, transpiration and Stomatal physiology; mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms; Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants; Respiration: Glycolysis, TCA-cycle and electron transport chain; Plant growth regulators: Physiological roles and agricultural uses, Internal anatomy of stems, roots and leaves. Study of family and their species-

Monocot Families

- **Araceae- Colocasia.**
- **Graminae-Triticum, Hordeum, Oryza, Zea, Pennisetum, Sorghum**

Dicot Families

- **Leguminosae-Pisum, Cicer, Croton, Cajanus, Arachis,**
- **Cucurbitaceae-Luffa, Lagenaria.**
- **Cruciferae- Brassica**
- **Solanceae-Solanum, Nicotiana.**
- **Euphorbiaceae-Ricinus**
- **Linaceae-Linum**

- **Pedaliaceae-Sesamum.**
- **Compositae-Carthamus.**
- **Tiliaceae-Carchorus**
- **Malvaceae- Hibiscus, Gossypium**

Practical

Study of plant cells, Internal anatomy of stems, roots and leaves; structure and distribution of stomata, imbibitions, osmosis, plasmolysis, Measurement of root pressure, rate of transpiration, Separation of photosynthetic pigments through paper chromatography, Rate of transpiration, photosynthesis, respiration, tissue test for mineral nutrients, estimation of relative water content. Plants and flowers description and identification

2. GPB-121: Fundamentals of Genetics

3(2+1)

Theory

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity. Architecture of chromosome; chromonemata, chromosome matrix, chromomeres, centromere, secondary constriction and telomere; special types of chromosomes. Chromosomal theory of inheritance- cell cycle and cell division- mitosis and meiosis. Probability and Chi-square. Dominance relationships, Epistatic interactions with example. Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping. Structural and numerical variations in chromosome and their implications, Use of haploids, di-haploids and doubled haploids in Genetics. Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation. Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cyto-plasmic inheritance. Genetic disorders. Nature, structure & replication of genetic material. Protein synthesis, Transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation, Lac and Trp operons.

Practical

Study of microscope. Study of cell structure. Mitosis and Meiosis cell division. Experiments on monohybrid, di-hybrid, tri-hybrid, test cross and back cross, Experiments on epistatic interactions including test cross and back cross, Practice on mitotic and meiotic cell division, Experiments on probability and Chi-square test. Determination of linkage and cross-over analysis (through two point test cross and three point test cross data). Study on sex linked inheritance in Drosophila. Study of models on DNA and RNA structures.

3. GPB-122: Environmental Studies and Disaster Management

3 (2+1)

Theory

Environmental Definition, scope and importance.

Environmental Resources: Renewable and non-renewable resources, Natural resources, type and associated problems.

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Aquatic ecosystems. Biodiversity and its conservation:

Environmental Pollution: definition, causes, types, effects and control measures.

Solid Waste Management: causes, effects and control measures.

Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents Wasteland reclamation. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness..

Disaster Management

Natural Disasters- Meaning and nature of natural disasters, their types and effects.

Man Made Disasters- Meaning and nature of Man Made disasters, their types and effects.

Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community –based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

Practical

Pollution case studies. Case Studies- Field work: Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain, visit to a local polluted site-Urban/Rural/Industrial/ Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc. Study of pollutants and contaminants

4. GPB-231: Fundamentals of Plant Breeding

3(2+1)

Theory

Historical development, concept, nature and role of plant breeding, major achievements and future prospects; Genetics in relation to plant breeding, modes of reproduction and apomixes, self-incompatibility and male sterility-genetic consequences, cultivar options. Domestication, Acclimatization and Introduction; Centres of origin/diversity, components of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops - mass and pure line selection, hybridization techniques and handling of segregating population; Multiline concept. Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection; Population improvement Schemes-Ear to row method, Modified Ear to Row, recurrent selection schemes; Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization; Maintenance of breeding records and data collection; Wide hybridization and pre breeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses; Breeding for important biotic and abiotic stresses; Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding; Intellectual Property Rights, Patenting, Plant Breeders and & Farmer's Rights.

Practical

Plant Breeder's kit, Study of germ-plasm of various crops. Study of floral structure of self-pollinated and cross pollinated crops. Emasculation and hybridization techniques in self & cross pollinated crops. Consequences of inbreeding on genetic structure of resulting populations. Study of male sterility system. Handling of segregation populations. Methods of calculating mean, range, variance, standard deviation, heritability. Designs used in plant breeding experiments, analysis of Randomized Block Design. To workout the mode of pollination in a given crop and extent of natural out-crossing. Prediction of performance of double cross hybrids.

5. GPB-241: Fundamentals of Biotechnology

2(1+1)

Theory

Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther culture, pollen culture and ovule culture and their applications; Micro-propagation methods; organogenesis and embryogenesis, Synthetic seeds and their significance; Embryo rescue and its significance; somatic hybridization and hybrids; Soma-clonal variation and its use in crop improvement; cryo-preservation; Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods; Transgenics and its importance in crop improvement; PCR techniques and its applications; RFLP, RAPD, SSR; Marker Assisted Breeding in crop improvement; Biotechnology regulations.

Practical

Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium. Callus induction from various explants. Micro-propagation, hardening and acclimatization. Demonstration on isolation of DNA. Demonstration of electrophoresis techniques and DNA fingerprinting.

6. GPB-351: Crop Improvement – I (*Kharif*)

2(1+1)

Theory

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibres; fodders and cash crops; vegetable and horticultural crops; Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters; Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. Ideotype concept and climate resilient crop varieties for future.

Practical

Floral biology, emasculation and hybridization techniques in different crop species; viz., Rice, Jute, Maize, Sorghum, Pearl millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut, Sesame, Caster, Cotton, Cowpea, Tobacco, Brinjal, Okra and Cucurbitaceous crops. Maintenance breeding of different *kharif* crops. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods; Study of field techniques for seed production and hybrid seeds production in *Kharif* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, donor parents for different characters; Visit to seed production plots; Visit to AICRP plots of different field crops.

7. GPB-361: Crop Improvement – II (*Rabi*)

2(1+1)

Theory

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops; Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology of *rabi* crops. Ideotype concept and climate resilient crop varieties for future.

Practical

Floral biology, emasculation and hybridization techniques in different crop species namely Wheat, Oat, Barley, Chickpea, Lentil, Field pea, Rajma, Horse gram, Rapeseed Mustard, Sunflower, Safflower, Potato, Berseem. Sugarcane, Tomato, Chilli, Onion; Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods; Study of field techniques for seed production and hybrid seeds production in *Rabi* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field

experiments; Study of quality characters, study of donor parents for different characters; Visit to seed production plots; Visit to AICRP plots of different field crops

8. GPB-362: Principles of Seed Technology

3(2+1)

Theory

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality; Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. Seed certification, phases of certification, procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983, Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production. Seed drying, processing and their steps, Duster, vcu test seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage. Seed marketing: structure and organization, sales generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing. Private and public sectors and their production and marketing strategies.

Practical

Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea. Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard. Seed production in important vegetable crops. Seed sampling and testing: Physical purity, germination, viability, etc. Seed and seedling vigour test. Genetic purity test: Grow out test and electrophoresis. Seed certification: Procedure, Field inspection, Preparation of field inspection report. Visit to seed production farms, seed testing laboratories and seed processing plant

9. GPB-363: Intellectual Property Rights

1(1+0)

Theory

Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc. Types of Intellectual Property and legislations covering IPR in India: Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets. Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent data base. Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights. Traditional knowledge-meaning and rights of TK holders. Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.

10 GPB-364: Commercial Plant Breeding (Elective Course)

3(1+2)

Theory

Types of crops and modes of plant reproduction. Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production. Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc. Quality seed production of vegetable crops under open and protected environment. Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and

biotechnological tools. IPR issues in commercial plant breeding: DUS testing and registration of varieties under PPV & FR Act. Variety testing, release and notification systems in India. Principles and techniques of seed production, types of seeds, quality testing in self and cross pollinated crops.

Practical

Floral biology in self and cross pollinated species, selfing and crossing techniques. Techniques of seed production in self and cross pollinated crops using A/B/R and two line system. Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production, Tools and techniques for optimizing hybrid seed production. Concept of rouging in seed production plot. Concept of line its multiplication and purification in hybrid seed production. Role of pollinators in hybrid seed production. Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed-mustard, sunflower, castor, pigeon pea, cotton and vegetable crops. Sampling and analytical procedures for purity testing and detection of spurious seed. Seed drying and storage structure in quality seed management. Screening techniques during seed processing viz., grading and packaging. Visit to public private seed production and processing plants.

3. Soil Science and Agricultural Chemistry

1	SAC-111	Fundamentals of Soil Science	3(2+1)
2	SAC-121	Manures, Fertilizers and Soil Fertility Management	3(2+1)
3	SAC-231	Fundamentals of Plant Biochemistry	3(2+1)
4	SAC-241	Problematic soils and their Management	2(1+1)
5	SAC-242	Agricultural Microbiology	2(1+1)
6	SAC-243	Bio-pesticides and Bio-fertilizers(Elective)	3(2+1)
7	SAC-351	Geo-informatics and Nanotechnology	2(1+1)
8	SAC-352	Agrochemicals (Elective)	3(2+1)
Total- 21			

1. SAC-111: Fundamentals of Soil Science

3(2+1)

Theory

Soil as a natural body, Pedological and edaphological concepts of soil; Soil genesis: soil forming rocks and minerals; weathering, processes and factors of soil formation; Soil Profile, components of soil; Soil physical properties: soil-texture, structure, density, porosity and soil colour. Elementary knowledge of soil taxonomy classification and soils of India; Soil water retention, movement and availability; Soil air, composition, gaseous exchange, problem and plant growth, Soil temperature; source, amount and flow of heat in soil; effect on plant growth, Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability; soil colloids-inorganic and organic; silicate clays: constitution and properties; sources of charge; anion exchange, Cation exchange capacity, base saturation; soil organic matter: composition, properties and its influence on soil properties; humic substances - nature and properties. Soil pollution - behavior of pesticides and inorganic contaminants, prevention and mitigation of soil pollution.

Practical

Study of soil profile in field. Study of soil sampling tools, collection of representative soil sample, its processing and storage. Study of soil forming rocks and minerals. Determination of soil density, moisture content and porosity. Determination of soil texture by feel and Bouyoucos Methods. Studies of capillary rise phenomenon of water in soil column and water movement in soil. Determination of soil pH and electrical conductivity. Determination of cation exchange capacity of soil. Study of soil map. Determination of soil colour. Demonstration of heat transfer in soil. Estimation of organic matter content of soil. Study of soil moisture measuring devices, Measurement of field capacity, infiltration rate.

2. SAC-121: Manures, Fertilizers and Soil Fertility Management

3(2+1)

Theory

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management. Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, nanofertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order. History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

Practical

Introduction of analytical instruments and their principles, calibration and applications, Colorimetry and flame photometry. Estimation of soil organic carbon, Estimation of alkaline hydrolysable N in soils. Estimation of soil extractable P in soils. Estimation of exchangeable K; Ca and Mg in soils . Estimation of soil extractable S in soils. Estimation of DTPA extractable Zn in soils. Estimation of N in plants. Estimation of P in plants. Estimation of K in plants. Estimation of S in plant

3. SAC -231: Fundamentals of Plant Biochemistry

3(2+1)

Theory

Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotation; Structure of Disaccharides and Polysaccharides. Lipid, Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids. Proteins: Importance of proteins and classification; Structures, titration and zwitter ions nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action; Michaelis &Menten and Line Weaver Burk equation &plots; Introduction to allosteric enzymes. Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates: Glycolysis, TCA cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.

Practical

Preparation of solution, pH & buffers, Qualitative tests of carbohydrates and amino acids. Quantitative estimation of glucose/ proteins. Titration methods for estimation of amino acids/lipids, Effect of pH, temperature and substrate concentration on enzyme action, Paper chromatography/ TLC demonstration for separation of amino acids/ Monosaccharides. Sterilization techniques. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium. Callus induction from various explants. Micro-propagation, hardening and acclimatization. Demonstration on isolation of DNA. Demonstration of gel electrophoresis techniques and DNA finger printing.

4. SAC-241: Problematic Soils and their Management

2(1+1)

Theory

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties. Reclamation and management of Saline and sodic soils, Acid soils, Acid sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils. Irrigation water – quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils. Multipurpose tree species, bio

remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystems.

Practical

Analysis for soil health, Measurement of Soil salinity, alkalinity, acidity, lime requirement, ESP, SAR, Gypsum requirement, analysis of quality of irrigation water. Identification of tree, crops and grasses for problematic soil.

5.SAC-242: Agricultural Microbiology

2(1+1)

Theory

Introduction. Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photo autotrophy growth. Soil organism; macro and micro organisms their beneficial and harmful effects. Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and Sulphur cycles. Biological nitrogen fixation- symbiotic, associative and asymbiotic. Azolla, blue green algae and mycorrhiza. Rhizosphere and phyllosphere. Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste.

Practical

Introduction to microbiology laboratory and its equipments; Microscope- parts, principles of microscopy, resolving power and numerical aperture. Methods of sterilization. Nutritional media and their preparations. Enumeration of microbial population in soil- bacteria, fungi, actinomycetes. Methods of isolation and purification of microbial cultures. Isolation of *Rhizobium* from legume root nodule. Isolation of *Azotobacter* from soil. Isolation of *Azospirillum* from roots. Isolation of BGA. Staining and microscopic examination of microbes.

6. SAC-243: Biopesticides and Biofertilizers (Elective Course)

3(2+1)

Theory

History and concept of biopesticides. Importance, scope and potential of biopesticide. Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and biorationales. Botanicals and their uses. Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomo-pathogenic pathogens and nematodes. Methods of application of biopesticides. Methods of quality control and Techniques of biopesticides. Impediments and limitation in production and use of biopesticide.

Biofertilizers - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- *Azospirillum*, *Azotobacter*, *Bacillus*, *Pseudomonas*, *Rhizobium* and *Frankia*; Cynobacterial biofertilizers- *Anabaena*, *Nostoc*, Hapalo siphon and fungal biofertilizers- VAM mycorrhiza and ectomycorrhiza. Nitrogen fixation -Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization. Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertilizers. FCO specifications and quality control of biofertilizers. Application technology for seeds, seedlings, tubers, sets etc. Biofertilizers -Storage, shelf life, quality control and marketing. Factors influencing the efficacy of biofertilizers.

Practical

Isolation and purification of important biopesticides: *Trichoderma Pseudomonas*, *Bacillus*, *Metarhizium* etc and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities in field condition. Quality control of biopesticides. Isolation and purification of *Azospirillum*, *Azotobacter*, *Rhizobium*, P-solubilizers and cyanobacteria. Mass multiplication and inoculums production of biofertilizers. Isolation of AMfungi -Wet sieving method and sucrose gradient method. Mass production of AM inoculants.

7. SAC-351: Geo-informatics and Nano-technology

2(1+1)

Theory

Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture. Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system(GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture; Nano-technology, definition, concepts and techniques, brief introduction about nano-scale effects, nano-particles , nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity.

Practical

Introduction to GIS software, spatial data creation and editing. Introduction to image processing software. Visual and digital interpretation of remote sensing images. Generation of spectral profiles of different objects. Supervised and unsupervised classification and acreage estimation. Multispectral remote sensing for soil mapping. Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. Use of GPS for agricultural survey. Formulation, characterization and applications of nano-particles in agriculture. Projects formulation and execution related to precision farming.

8. SAC-352: Agrochemicals (Elective Course)

3 (2+1) Theory

An introduction to agrochemicals, their type and role in agriculture, effect on environment, soil, human and animal health, merits and demerits of their uses in agriculture, management of agrochemicals for sustainable agriculture.

Herbicides-Major classes, properties and important herbicides. Fate of herbicides.

Fungicides - Classification – Inorganic fungicides - characteristics, preparation and use of sulfur and copper, Mode of action-Bordeaux mixture and copper oxy-chloride. Organic fungicides- Mode of action- Dithio-carbamates-characteristics, preparation and use of Zineb and maneb. **Systemic fungicides**- Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics and use.

Introduction and classification of insecticides: inorganic and organic insecticides Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals, Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant. IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses.

Fertilizers and their importance. Nitrogenous fertilizers: Feed stocks and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow release N-fertilizers. **Phosphatic fertilizers:** feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulphate and potassium nitrate.

Mixed and complex fertilizers: Sources and compatibility–preparation of major, secondary and micronutrient mixtures. Complex fertilizers: Manufacturing of ammonium phosphates, nitro-phosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent.

Practical

Sampling of fertilizers and pesticides. Pesticides application technology to study about various pesticides appliances. Quick tests for identification of common fertilizers. Identification of anion and cation in fertilizer. Calculation of doses of insecticides to be used. To study and identify various formulations of insecticide available in market. Estimation of nitrogen in Urea. Estimation of water soluble P_2O_5 and citrate soluble P_2O_5 in single super phosphate. Estimation of potassium in Murate of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in copper oxy-chloride. Determination of sulphur content in sulphur fungicide. Determination of thiram. Determination of ziram content.

4. Agricultural Economics and Statistics

1	AES-111	Fundamentals of Agricultural Economics	2(1+1)
2	AES-121	Agri- Informatics and Computer Application	3(2+1)
3	AES-231	Statistical Methods	2(1+1)
4	AES-232	Agricultural Finance and Co-Operation	3(2+1)
5	AES-241	Agricultural Marketing Trade & Prices	3(2+1)
6	AES-351	Farm Management, Production & Resource Economics	3(2+1)
7	AES-361	Agribusiness Management	3(2+1)
**	AES-112	Elementary Mathematics (Elective) ** Non gradial	2(2+0)
Total- 19+2=21			

1.AES-111: Fundamentals of Agricultural Economics

2(1+1)

Theory

Economics: Meaning, definitions, scope and subject matter, approaches to economic analysis; micro and macro-economics, positive and normative analysis; Nature of economic theory; rationality assumption. *Basic concepts*: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare. *Agricultural economics* :meaning, definition; characteristics of agriculture, importance and its role in economic development. *Demand*: meaning, law of demand, schedule and demand curve, determinants, utility theory: law of diminishing marginal utility, equi-marginal utility principle, concept of consumer surplus. *Elasticity of demand*: concept and measurement of price elasticity, income elasticity and cross elasticity. *Supply*: Stock v/s supply, law of supply, schedule, supply curve, determinants of supply, elasticity of supply. *Production and Cost*: production process, creation of utility, factors of production, input-output relationship, Laws of returns-Law of variable proportions and law of returns to scale, cost concepts, shortrun and longrun cost curves. *Market structure*: meaning and types of market, basic features of perfectly competitive and imperfect markets. *Factor pricing*: Meaning, concepts of rent, wage, interest and profit. *National income*: Meaning and importance, concepts of national income accounting and approaches to measurement. *Money*: Meaning and functions of money; Barter system of exchange and its problems, inflation and deflation; *Banking*: Role in modern economy, types of banks, functions of commercial and central bank. *Public finance*: meaning, public revenue and public expenditure; *Tax*: meaning, direct and indirect taxes, agricultural taxation. *Economic systems*: important features of capitalistic, socialistic and mixed economies.

Practical:

Estimation of elasticity of demand for agricultural commodities; identify the determinants of the demand and supply for major agricultural commodities produced in Uttar Pradesh; preparation of list of inputs used in various agricultural enterprises (crops, dairy, fisheries, poultry etc.); estimation of Marginal Product (MP), Average Product (AP), Marginal Cost (MC) & Average Cost (AC); analyse the composition of Government's Annual Financial Statements (Budget); analyse the composition and growth trends of Agricultural Gross Domestic Product (Ag GDP).

2. AES-121: Agri-Informatics and Computer Application

3(2+1)

Theory

Computer Application-Introduction to Computers, Operating Systems, definition and types, Applications of MS Office for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations. *Agri-informatics*: e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for under standing plant processes. IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, post-harvest management etc; Geospatial technology for generating

valuable agri-information. Decision support systems-concepts, components and applications in Agriculture, Agriculture Expert System, Information Systems etc. for supporting Farm decisions. Preparation of contingent crop-planning using IT tools.

Practical:

Study of Computer Components, accessories, practice of important DOS Commands. Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (www). Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools. Introduction of Geospatial Technology for generating valuable information for Agriculture. Hands on Decision Support System. Preparation of contingent crop planning.

3. AES- 231 : Statistical Methods

2(1+1)

Theory

Introduction to statistics and its application in agriculture. Diagrammatic and Graphical representation of data. Measures of Central Tendency (Mean, Median, Mode), Measures of Dispersion Range, Mean Deviation, Standard Deviation, Variance and Coefficient of Variation(C.V.) and Standard Error of Mean(S.E.). Definition and types of correlation, Karl Pearson Coefficient of correlation and its properties. Regression and line of regression, regression coefficient and its properties

Test of Significance- Concept of Random Sample and statistics, Test of significant based on Z, t, f and Chi- Square (χ^2) statistics. Test of independence of Attributes in 2x2 contingency table. Introduction to analysis of variance for one way and two way classification. Introduction to sampling methods, simple random sampling with and without replacement. Random number table and its uses.

Practical

Diagrammatic and Graphical representation of data. Measures of Central Tendency-Computation of Arithmetic mean, Median and Mode for Ungrouped and Grouped data. Measures of Dispersion-Computation of Mean deviation, Standard deviation, Variance and Coefficient of Variation for Ungrouped and Grouped data. Calculation of Correlation coefficient and Determination of Regression Line. Calculation based on t, z test. Chi- Square (χ^2) test of Goodness of Fit. Chi-Square (χ^2) test of Independence of Attributes for 2x2 contingency table. Analysis of Variance for One Way and Two Way Classification.

4. AES-232 : Agricultural Finance and Co-Operation

3(2+1)

Theory

Agricultural Finance- meaning, scope and significance; Agricultural credit: meaning, definition, classification, credit needs and its role in Indian agriculture. Sources of agricultural finance: institutional and non-institutional sources; constraints in institutional credit and problems of indebtedness. Institutional framework: Reserve Bank of India (RBI), NABARD, Commercial banks, social control and nationalization of commercial banks, Regional Rural Banks (RRBs), Cooperative Banks; Concept of Micro finance, Self-Help Groups (SHGs), Joint Liability Groups (JLGs), Kisan Credit Card (KCC) Scheme, Lead Bank Scheme. Recent development in agricultural credit. Credit analysis: 3 C's, 3 R's and 7 P's of credit, scale of finance and unit cost, cost of credit. Preparation and analysis of financial statements – Balance Sheet and Income Statement. Basic guidelines for preparation of Details Project

Reports (DPR). *Agricultural Cooperation*-Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture. Agricultural Cooperation in India-credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperatives societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED.

Practical

Determination of most profitable level of capital use. Optimum allocation of limited amount of capital among different enterprise. Analysis of progress and performance of cooperatives using published data. Analysis of progress and performance of commercial banks and RRBs using published data. Visit to a commercial bank, cooperative bank and cooperative society to acquire firsthand knowledge of their management, schemes and procedures. Estimation of credit requirement of farm business – A case study. Preparation and analysis of balance sheet – A case study. Preparation and analysis of income statement – A case study. Appraisal of a loan proposal- A case study. Techno-economic parameters for preparation of projects. Preparation of Bankable projects for various agricultural products and its value-added products.

5.AES- 241 : Agricultural Marketing, Trade & Prices

3(2+1)

Theory

Agricultural Marketing-Concepts and definitions of market, marketing, agricultural marketing, market structure, classification and characteristics of agricultural markets; nature and determinants of demand and supply of farm products, producer's surplus meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities; Marketing process-concentration, dispersion and equalization; Marketing services and functions: exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (Ag-mark); Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products; Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs; Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP, SFAC & DMI – their objectives and functions, agricultural market legislations. Problems of Agricultural marketing and Measures taken by the Govt.; cooperative marketing in India. *Agricultural prices and policy*: agricultural prices-fluctuations; administered prices; Measures taken to stabilise agricultural prices, need for agricultural price policy. *Trade*: Concept of International Trade and its need, Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (AoA).

Practical

Plotting and study of demand and supply curves and calculation of elasticities; Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behavior over time for some selected commodities; Visit to a local market to study various marketing function super formed by different agencies, identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class; Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc.

6. AES-351: Farm Management, Production and Resource Economics

3(2+1)

Theory

Farm management: Meaning, definition and objectives; farms: Meaning, definitions, types and characteristics, factors determining types and size of farms. Types and Systems of farming, factors affecting types of farming. Principles of farm management. Farm records and accounts: types of farm records, farm inventory, balance sheet, profit and loss accounts. Farm income: gross farm income, net farm income, family labour income and farm business income. Farm planning and budgeting: Meaning and importance, partial and complete budgeting, steps in farm planning. *Production economics*: meaning and definitions; basic concepts. Factor-Product relationship: types, rational & irrational stages of production, determination of optimum input or output levels; Factor-Factor relationship: types, iso-quant curve, iso-cost lines, least cost combination, iso-curve, expansion path, Ridge lines; Product-Product relationship: types of product possibilities, iso-revenue line, budget line, optimum Product combination. Production function: meaning, definitions, assumptions, types, forms and use of production function. Linear programming: meaning, definitions, assumptions, advantages and limitations. Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies. *Resource economics*: Concepts, unique properties of natural resources. Positive and negative externalities in agriculture.

Practical

Preparation of farm layout. Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of most profitable level of inputs use in a farm production process. Determination of least cost combination of inputs. Selection of most profitable enterprise combination. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India.

7. AES-361: Agri-business Management

3 (2+1)

Theory

Agribusiness: meaning and definitions, various stakeholders and components of agribusiness systems, distinctive features of Agribusiness Management, transformation of agriculture into agribusiness. Importance of agribusiness in the Indian economy and New Agricultural Policy. Importance and needs of agro-based industries, Classification of industries and types of agro based industries. Institutional arrangement, procedures to set up agro-based industries. Constraints in establishing agro-based industries. Agri-value chain: Understanding primary and support activities and their linkages. Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Organization culture. Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, policies procedures, rules, programs and budget. Components of a business plan, Steps -in planning and implementation. Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control. Capital Management and Financial management of Agribusiness. Financial statements and their importance. Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies. Product life cycle (PLC). Sales & Distribution Management. Pricing policy, various pricing methods. Project Management definition, project cycle, identification, formulation, appraisal, implementation, monitoring and evaluation. Project Appraisal and evaluation techniques.

Practical:

Study of agri-input markets: Seed, fertilizers, pesticides. Study of output markets: grains, fruits, vegetables, flowers. Study of product markets, retail trade commodity trading, and value-added products. Study of financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD. Preparations of projects and Feasibility reports for agribusiness entrepreneur. Appraisal/evaluation techniques of identifying viable project- Non-discounting techniques. Case study of agro-based industries. Net Present Worth (NPW) technique for selection of viable project. Internal rate of return (IRR).

Theory

Straight lines: Distance Formula, Section Formula (internal and external division), Equation of co-ordinate axes, Equation of lines parallel to axes, Two point form of equation of line, Normal form of equation of line, Point of intersection of two straight lines, Angles between two straight lines, Parallel lines. *Circle*: Equation of circle whose center and radius is known, general equation of a circle, Equation of circle passing through three given points. *Differential Calculus*: Definition, limit and continuity of a function, Simple problems on limit and continuity, Differentiation of x^n , e^x , a^x , $\log x$ & $\sin x$, $\cos x$, $\tan x$, $\sec x$, $\operatorname{cosec} x$ & $\cot x$ from first principle, Derivatives of sum, difference, product and quotient of two functions, Differentiation of functions of functions (Simple problem based on it), Logarithmic differentiation (Simple problem based on it), Differentiation by substitution method (Simple problems based on it). *Integral Calculus*: Integration of simple functions, Integration by Parts: Integration of Product of two functions, Integration by substitution method, Definite Integral (simple problems based on it). *Determinants and Matrices*: Introduction of determinants, Properties of determinants up to 3rd order and their evaluation, Definition of Matrices, type of Matrices and properties, Addition, Subtraction, Multiplication, Transpose and Inverse of a matrix up to 3rd order.

5. Plant Pathology

1	PPA-121	Fundamentals of Plant Pathology	4(3+1)
2	PPA-231	Diseases of Field and Horticultural Crops and their Management-I	3(2+1)
3	PPA-241	Diseases of Field and Horticultural Crops and their Management-II	3(2+1)
4	PPA-351	Principles of Integrated Pest and Disease Management	3(2+1)
Total - =13			

1. PPA – 121: Fundamentals of Plant Pathology**4(3+1)****Theory**

Introduction: Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology. Causes / factors affecting disease development: disease triangle and tetrahedron and classification of plant diseases. Important plant pathogenic organisms, different groups: fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae,

protozoa, phanerogamic parasites and nematodes. Life cycle of *Phytophthora*, *Albugo*, *Erysiphae*, *Puccinia*, *Mucor*, *Alternaria*, *collectotrichum*, *ustilago*, and *Fusarium*.

Fungi: general characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions, sub-divisions, orders and classes.

Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction.

Viruses: nature, structure, replication and transmission. Study of phanerogamic plant parasites.

Nematodes: General morphological characters and importance of plant nematodes (*Heterodera*, *Meloidogyne*, *Anguina*)

Practical

Acquaintance with various laboratory equipments and microscopy. Collection and preservation of disease specimen. Preparation of media, isolation and Koch's postulates. General study of different structures of fungi. Study of symptoms of various plant diseases. Study of representative fungal genera. Staining and identification of plant

pathogenic bacteria. Transmission of plant viruses. Study of phanerogamic plant parasites. Study of morphological features and identification of plant parasitic nematodes. Sampling and extraction of nematodes from soil and plant material, preparation of nematode mounting. Study of fungicides and their formulations. Methods of pesticide application and their safe use. Calculation of fungicide sprays concentrations.

2. PPA – 231: Diseases of Field & Horticultural Crops & their Management-I **3(2+1)**

Theory

Symptoms, etiology, disease cycle and management of major diseases of following crops:

Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; Maize: smut, downy mildew, leaf spots; Sorghum: anthracnose, Bajra :downy mildew and ergot; Groundnut: Tikka disease of ground nut, wilt Pigeonpea: Phytophthora blight, wilt and sterility mosaic; black & greengram: Cercospora leaf spot and anthracnose, web blight and yellow mosaic; Tobacco: mosaic. Horticultural Crops: Guava: wilt and anthracnose; Banana: Panama wilt, bacterial wilt, Sigatoka and bunchy top; Papaya: foot rot, leafcurl and mosaic, Pomegranate: bacterial blight; Cruciferous vegetables: Alternaria leaf spot and black rot; Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; Tomato: damping off, wilt, early and late blight, leaf curl; Okra: Yellow Vein Mosaic; Beans: anthracnose ; Ginger: soft rot; Colocasia: Phytophthora blight; Coconut: wilt and bud rot; Tea: blister blight; Coffee: rust

Practical

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for Herbarium; Note: Students should submit 50 pressed and well mounted specimens.

3. PPA – 241: Diseases of Field and Horticultural Crops & their Management-II **3(2+1)**

Theory

Symptoms, etiology, disease cycle and management of following diseases:

Field Crops:

Wheat: rusts, loose smut, karnal bunt, powdery mildew, and ear cockle; Sugarcane: red rot, smut, wilt, grassy shoot, ratoon stunting; Sunflower: Sclerotinia stem rot and Alternaria blight; Mustard: Alternaria blight, white rust,downy mildew and Sclerotinia stem rot; Gram: wilt, grey mould and Ascochyta blight; Lentil: rust and wilt; Cotton: anthracnose, vascular wilt, and black arm; Pea: downy mildew, powdery mildew and rust.

Horticultural Crops:

Mango: anthracnose, malformation, bacterial blight and powdery mildew; Citrus: canker and gummosis; Grape vine: downy mildew, Powdery mildew and anthracnose; Apple: scab, powdery mildew, fire blight and crown gall; Peach: leaf curl. Potato: early and late blight, black scurf, and mosaic; Cucurbits: downy mildew, powdery mildew, wilt; Onion and garlic: purple blotch, and Stemphylium blight; Chillies: anthracnose and fruit rot, wilt and leaf curl; Turmeric: leaf spot

Coriander: stem gall Marigold: Botrytis blight; Rose: dieback, powdery mildew and black leaf spot.

Practical

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for herbarium.

Note: Students should submit 50 pressed and well-mounted specimens.

4. PPA – 351: Principles of Integrated Pest and Disease Management **3(2+1)**

Theory

Entomology

Categories of insect pests IPM: Introduction, history, importance, concepts, principles and tools of IPM. Economic importance of insect pests and pest risk analysis. Methods of detection and diagnosis of insect pest. Calculation and dynamics of economic injury level and importance of Economic threshold level. Ecological management of crop environment. Introduction to conventional pesticides for the insect pests management. Survey surveillance and forecasting of Insect pests. Development and validation of IPM module. Implementation and impact of IPM module for Insect pest. Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programmes.

Plant Pathology

Type and economic importance of diseases. Principle and Method of Plant Disease Management. Methods of detection of diseases. Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control. Introduction to conventional fungicides for the disease management. Survey surveillance and forecasting of diseases. Impact of IPM on diseases. Mode of action and formulations of fungicides and antibiotics.

Practical

Methods of diagnosis and detection of various insect pests, and plant diseases, Methods of insect pests and plant disease measurement, Assessment of crop yield losses, calculations based on economics of IPM, Identification of biocontrol agents, different predators and natural enemies. Mass multiplication of *Trichoderma*, *Pseudomonas*, *Trichogramma*, NPV etc. Identification and nature of damage of important insect pests and diseases and their management. Crop (agro ecosystem) dynamics of a selected insect pest and diseases. Plan & assess preventive strategies (IPM module) and decision making. crop monitoring attacked by insect, pest and diseases. Awareness campaign at farmers fields.

6. Entomology

1	ENT-111	Fundamentals of Entomology	3(2+1)
2	ENT-231	Insect Systematic and IPM	2(1+1)
3	ENT- 351	Pests of Crops and Store Grains and their Management	3 (2+1)
4	ENT-361	Management of Beneficial Insects	2(1+1)
***	ENT- 112	Elementary Biology (Elective) ** Non gradial	2(1+1)
Total - 10+2=12			

1. ENT-111: Fundamentals of Entomology

3(2+1)

Part – I

History of Entomology in India. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor.

Part-II

Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors– temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Effect of biotic factors – food competition, natural and environmental resistance.

Practical

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper).

2. ENT-231: Insect Systematics and IPM

2(1+1)

Part I

Categories of pests. Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical control importance, hazards and limitations. Recent methods of pest control, repellents, anti feed ants, hormones, attractants, gamma radiation. Insecticides Act 1968- Important provisions. Application techniques of spray fluids. Symptoms of poisoning, first aid and antidotes.

Part – II

Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papilionidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthredinidae, Apidae. Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.

Practical

Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. Insecticides and their formulations. Pesticide appliances and their maintenance. Sampling techniques for estimation of insect population and damage.

3. ENT-351: Pests of Crops and Stored Grains and their Management

3(2+1)

Theory

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics, nature of damage, and management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crop, vegetable crop, fruit crop. Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain. Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

Practical

Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops. Identification of insect pests and Mites associated with stored grain. Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique. Fumigation of grain store / godown. Identification of rodents and rodent control operations in godowns. Identification of birds and bird control operations in godowns. Determination of moisture content of grain. Methods of grain sampling under storage condition. Visit to Indian Storage Management and Research

Institute, Hapur and Quality Laboratory, Department of Food., Delhi. Visit to nearest FCI godowns.

4.ENT-361: Management of Beneficial Insects

2(1+1)

Theory

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection. Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac- products. Identification of major parasitoids and predators commonly being used in biological control. Insect orders bearing predators and parasitoids used in pest control.

Important species of pollinator, weed killers and scavengers with their importance.

Practical

Honey bee species, castes of bees. Beekeeping appliances and seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant

identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies. Identification and techniques for mass multiplication of natural enemies.

**** 5. ENT-112: Elementary Biology (Elective) Non Gradial**

2(1+1)

Theory

Introduction to living world, diversity and characteristics of life, origin of life evolution and eugenics. Binominal Nomenclature and classification, Cell and Cell division. Morphology of flowering plants, Seed and Seed germination and plant systematic - Brassicaceae , Fabaceae, and Poaceae. Role of animals in agriculture.

Practical

Morphology of flowering plants- Root, Stem and leaf and their modification, Inflorescence of flowers , Fruits Cell tissues and Cell division of plants and animals. Internal structure of plants - Brassicaceae , Fabaceae, and Poaceae.

7.Horticulture

1	HOR-121	Fundamentals of Horticulture	3(2+1)
2	HOR-231	Production Technology for Fruit and Plantation Crops	2(1+1)
3	HOR-241	Production Technology for Vegetables and Spices	2(1+1)
4	HOR-242	Hi-tech Horticulture	3(2+1)
5	HOR-351	Production Technology for Ornamental Crops, MAP and Landscaping	2(1+1)
6	HOR-352	Micro Propagation Technology (Elective)	3(2+1)
7	HOR-361	Post-harvest Management and Value Addition of Fruits and Vegetables	3(2+1)
8	HOR-362	Landscaping (Elective)	3(2+1)

1. HOR-121: Fundamentals of Horticulture (NEW)**3(2+1)****Theory**

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; Plant propagation, Principles of orchard establishment; Principles and methods of training and pruning, flower bud differentiation and fruit set; unfruitfulness; Importance of plant bio-regulators in horticulture. Irrigation – methods of irrigation in horticultural crops.

Practical

Identification of garden tools. Identification of horticultural crops. Practice of sexual and asexual methods of propagation. Layout and planting of orchard. Training and pruning of fruit trees. Preparation of potting mixture. Fertilizer application in different crops. Visits to commercial nurseries/orchard.

2. HOR-231: Production Technology for Fruit and Plantation Crops**2(1+1)****Theory**

Importance and scope of fruit in human diet and agricultural economy, Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava, litchi, papaya, apple, pear, peach, and; minor fruits pineapple, pomegranate, jackfruit, plantation crops-coconut, cashew, tea and coffee.

Practical

Seed propagation. Scarification and stratification of seeds. Propagation methods for fruit and plantation crops. Description and identification of fruit. Preparation of plant bio regulators and their uses, Important pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchards.

3. HOR-241: Production Technology for Vegetable and Spices**2 (1+1)****Theory**

Importance of vegetables & spices in human nutrition and national economy, vegetable gardening, Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of important vegetable and spices (Tomato, Brinjal, Chilli, Capsicum, Cucumber, Melons, Gourds, Pumpkin, Cole crops such as Cabbage, Cauliflower,; Bulb crops such as Onion, Garlic; Root crops such as Carrot, Radish, Leafy vegetables such as Amaranth, Palak. Spices such as black pepper, fenugreek, fennel and cumin).

Practical

Identification of vegetables & spice crops and their seeds. Preparation of nursery bed Nursery raising. Direct seed sowing and transplanting. Study of morphological characters of different vegetables & spices. Economics of vegetables and spices production.

4. HOR-242: Hi-tech. Horticulture**3(2+1)****Theory**

Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting methods, Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components; EC, pH based fertilizer scheduling, canopy management, high density orcharding, Components of precision farming, Variable Rate applicator (VRA), application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); mechanized harvesting of produce.

Practical

Types of polyhouses and shade net houses, Intercultural operations, tools and equipments identification and application, Micro propagation, Nursery-protrays, micro-irrigation, EC, pH based fertilizer scheduling, canopy management, visit to hi-tech orchard/nursery.

5. HOR-351: Production Technology for Ornamental Crops, MAPs and Landscaping **2 (1+1)**

Theory

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers. Production technology of important cut flowers like rose, gerbera, carnation, liliium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions. Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver. Processing and value addition in ornamental crops and MAPs produce.

Practical

Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and planting of MAP. Protected structures – care and maintenance. Intercultural operations in flowers and MAP. Harvesting and post harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

6. HOR-352: Micro propagation Technologies (Elective) **3(2+1)**

Theory

Introduction, History, Advantages and limitations of micro-propagation ; Types of cultures (seed, embryo, organ, callus, cell), Stages of micro-propagation, Axillary bud proliferation (Shoot tip and meristem culture, bud culture), Organogenesis (callus and direct organ formation), anther culture, pollen culture and ovule culture and their applications, Somatic embryogenesis, cell suspension cultures, Production of secondary metabolites, Somaclonal variation, Cryopreservation

Practical

Identification and use of equipments in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques for explants, Preparation of stocks and working solution, Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction, Induction of somatic embryos regeneration of whole plants from different explants, Hardening procedures

7. HOR-361: Post-harvest Management and Value Addition of Fruits and Vegetables **3(2+1)**

Theory

Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages. Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning – Concepts and Standards, packaging of products.

Practical

Applications of different types of packaging, containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and

preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry.

8. HOR-362: Landscaping (Elective)

3(2+1)

Theory

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes. Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme, Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

Practical

Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design, training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/ parks/ institutes.

8. Agricultural Engineering and Soil Water Conservation

1	AEG-111	Introductory Agro-meteorology & Climate Change	2(1+1)
2	AEG- 112	Farm Machinery and Power	3(2+1)
3	AEG-121	Introductory Soil and Water Conservation	3(2+1)
4	AEG-241	Renewable Energy and Green Technology	2(1+1)
5	AEG-351	System Simulation and Agro advisory (Elective Course)	3(2+1)
6	AEG-361	Introduction to Forestry	3(2+1)
7	AEG-362	Protected Cultivation and Secondary Agriculture	2(1+1)
Total- 18			

1. AEG-111: Introductory Agro-meteorology & Climate Change

2(1+1)

Theory

Meaning and scope of agricultural meteorology; Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anti cyclone, land breeze and sea breeze; Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, long wave and thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, forms of precipitation and its estimation. Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations; Modifications of crop microclimate, climatic for crop and livestock production. Weather forecasting- types of weather forecast and their uses. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

Practical

Visit of Agro meteorological Observatory, site selection of observatory, exposure of instruments and weather data recording. Measurement of total, shortwave and long wave radiation, and its estimation using Planck's intensity law. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis. Measurement of soil temperature and computation of soil heat flux. Determination of vapor pressure and relative humidity. Determination of dew point temperature. Measurement of atmospheric pressure and analysis of atmospheric conditions. Measurement of wind speed and wind direction, preparation of windrose. Measurement, tabulation and analysis of rain. Measurement of open pan evaporation and evapo transpiration. Computation of PET and AET.

2. AEG-112: Farm Machinery and Power

3(2+1)

Theory

Status of Farm Power in India, Sources of Farm Power, I.C. engines, working principles of I.C. engines, comparison of two stroke and four stroke cycle engines, Study of different components of I.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor, Tractor types, Cost analysis of tractor power and attached implement. Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Practical

Study of different components of I.C. engine. To study air cleaning and cooling system of engine. Familiarization with clutch, transmission, differential and final drive of a tractor. Familiarization with lubrication and fuel supply system of engine. Familiarization with brake, steering, hydraulic control system of engine. Learning of tractor driving. Familiarization with operation of power tiller. Implements for hill agriculture. Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow. Familiarization with seed-cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter. Familiarization with different types of sprayers and dusters. Familiarization with different inter-cultivation equipment Familiarization with harvesting and threshing machinery.

3 AGE-121: Introductory Soil and Water Conservation

3(2+1)

Theory

Introduction to Soil and Water Conservation, causes of soil erosion. Definition and agents of soil erosion, water erosion: Forms of water erosion. Gully classification and control measures. Soil loss estimation by universal Loss Soil Equation. Soil loss measurement techniques. Principles of erosion control: Introduction to contouring, strip cropping. Contour bund. Graded bund and bench terracing. Grassed waterways and their design. Water harvesting and its techniques. Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

Practical

General status of soil conservation in India. Calculation of erosion index. Estimation of soil loss. Measurement of soil loss. Preparation of contour maps. Design of grassed water ways. Design of contour bunds. Design of graded bunds. Design of bench terracing system. Problem on wind erosion.

4 .AEG-241: Renewable Energy and Green technology

2(1+1)

Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for bio fuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bio alcohol, biodiesel and bio oil production and their utilization as bio energy resource, introduction of

solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, introduction of wind energy and their application..

Practical

Familiarization with renewable energy gadgets. To study biogas plants. To study gasifier. To study the production process of biodiesel. To study briquetting machine. To study the production process of bio-fuels. Familiarization with different solar energy gadgets. To study solar photovoltaic system: solar light ,solar pumping, and solar fencing. To study solar cooker. To study solar drying system. To study solar distillation and solar pond.

5. AEG-351: System Simulation and Agro advisory (Elective)

3(2+1)

Theory

System Approach for representing soil-plant-atmospheric continuum, system boundaries, Crop models, concepts & techniques, types of crop models, data requirements, relational diagrams. Evaluation of crop responses to weather elements; Elementary crop growth models; calibration, validation, verification and sensitivity analysis. Potential and achievable crop production- concept and modelling techniques for their estimation. Crop production in moisture and nutrients limited conditions; components of soil water and nutrients balance. Weather forecasting, types, methods, tools & techniques, forecast verification; Value added weather forecast, ITK for weather forecast and its validity; Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast. Use of crop simulation model for preparation of Agro-advisory and its effective dissemination.

Practical

Preparation of crop weather calendars. Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts. Working with statistical and simulation models for crop growth. Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with. limitations of water and nutrient management options. Sensitivity analysis of varying weather and crop management practices. Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast. Feedback from farmers about the agro advisory.

6. AEG – 361: Introduction to Forestry

3(2+1)

Theory

Introduction - definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies. Forest regeneration, Natural regeneration - natural regeneration from seed and vegetative parts, coppicing, root suckers; Artificial regeneration - objectives, choice between natural and artificial regeneration, essential preliminary considerations. Crown classification. Tending operations - weeding, cleaning, thinning - mechanical, ordinary, crown and advance thinning. Forest mensuration - objectives, diameter measurement, instruments used in diameter measurement; measurement of volume of felled and standing trees, age determination of trees. 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 of two important fast growing tree species of the region. introduction of forests survey and forest area calculation.

Practical

Identification of tree-species. Diameter measurements using calipers and tape, Volume measurement of logs using various formulae. Nursery lay out, seed sowing, vegetative propagation techniques. Forest plantations and their management. Visits of nearby forest based industries. forest area calculation.

7. AEG-362: Protective Cultivation and secondary Agriculture

2(1+1)

Green house technology: Introduction, Types of Green Houses; Plant response to Greenhouse environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes. Green house

equipment, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air greenhouse heating systems, green house drying. Cost estimation and economic analysis. Important Engineering properties such as physical, thermal and aero & hydro-dynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, re-circulatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

Practical

Study of different type of greenhouses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of greenhouse equipment. Visit to various Post Harvest Laboratories. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials) Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

9. Agricultural Extension and Communication

1	EXT-111	Comprehension & Communication Skills in English	2(2+0)
2	EXT-112	Human values and Ethics (Non Gradial)**	1(1+0)**
3	EXT-121	Fundamentals of Agricultural Extension Education	3(2+1)
4	EXT-231	Communication Skills and Personality Development	2(1+1)
5	EXT-241	Rural Sociology & Educational Psychology	2(2+0)
6	EXT-351	Entrepreneurship Development and Business Communication	2(1+1)
7	EXT-361	Agricultural Journalism (Elective)	3(2+1)
Total-14			

1. EXT-111: Comprehension and Communication Skills in English

2(2+0)

Theory

War Minus Shooting- The sporting Spirit. A Dilemma- A layman looks at science Raymond B. Fosdick. You and Your English – Spoken English and broken English G.B. Shaw. Reading Comprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confused words. Exercises to Help the students in the enrichment of vocabulary based on TOEFL and other competitive examinations. Functional grammar: Articles, Prepositions, Verb, Subject verb Agreement, Transformation, Synthesis, Direct and Indirect Narration. Written Skills: Paragraph writing, Precise writing, Report writing and Proposal writing. The Style: Importance of professional writing. Preparation of Curriculum Vitae and Job applications. Synopsis Writing. Interviews: kinds, Importance and process.

2. EXT – 112: Human values and Ethics (Non Gradial)**

1(1+0)

Theory

Values and Ethics-An Introduction. Goal and Mission of Life. Vision of Life. Principles and Philosophy. Self Exploration. Self Awareness. Self Satisfaction. Decision Making. Motivation. Sensitivity. Success. Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination.

3. EXT-121: Fundamentals of Agricultural Extension Education

3(2+1)

Theory

Education: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning- Meaning, Process, Principles and Steps in

Programme Development. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.); various extension/ agriculture development programmes launched by ICAR/ Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP, etc.). New trends in agriculture extension: privatization extension, cyber extension/ e-extension, ICT, market-led extension, farmer-led extension, expert systems, etc. Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Dev.-meaning, definition, concept & principles, Philosophy of C.D. transfer of technology: concept and models, capacity building of extension personnel; extension teaching methods: meaning, classification, individual, group and mass contact methods, Audio-visual aids.

Practical

To get acquainted with university extension system. Group discussion- exercise; handling and use of audio visual equipments and digital camera and LCD projector; preparation and use of A-V aids, preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories; Presentation skills exercise; micro teaching exercise; A visit to village to understand the problems being encountered by the villagers/ farmers; exposure to mass media: visit to community radio and television studio for understanding the process of programme production.

4. EXT-231:Communication Skills and Personality Development

2 (1+1)

Theory

Communication Skills: Structural and functional grammar; communication: meaning , definition and process; Principles and Functions of Communication, types of communication-verbal, non -verbal, formal, informal communication, models and barriers to communication, diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.

listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures; individual and group presentations, impromptu presentation, public speaking; Group discussion. Organizing seminars and conferences.

Practical

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures; individual and group presentations. script writing, writing for print and electronic media, developing script for radio and television.

5. EXT- 241: Rural Sociology and Educational Psychology

2(1+1)

Theory

Sociology and Rural sociology: Definition and scope, its significance in agriculture extension, Social Ecology, Rural society, Social Groups, Social Stratification, Culture: concept, Social Institution, Social Change & Development. Educational psychology: Meaning & its importance in agriculture extension. Behavior: Cognitive, affective, psychomotor domain, Personality, Learning, Motivation, Theories of Motivation, Intelligence. Rural Leadership: concept and definition, types of leaders in rural context.

Practical: Conducting socio-economic survey of an assigned village, social composition, occupational distribution, leadership and working of rural institutions, study of Self- Help Groups methods of assessment of personality, sociometric matrices.

6. EXT-351: Entrepreneurship Development and Business Communication

2 (1+1)

Theory

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; SWOT Analysis & achievement motivation, Government policy and programs and institutions for entrepreneurship development. Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills),

Problem solving skill, Supply chain management and Total quality management, Project Planning Formulation and report preparation;. extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes.

Practical

Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing, visit to entrepreneurship development institute and entrepreneurs.

7. EXT-361: Agricultural Journalism (Elective Course)

3(2+1)

Theory

Agricultural Journalism: The nature and scope of agricultural journalism characteristics and training of the agricultural journalist. Newspapers and magazines as communication media: Characteristics; kinds and functions of newspapers and magazines, characteristics of newspaper and magazine readers. The agricultural story: Types of agricultural stories, subject matter of the agricultural story, structure of the agricultural story. Gathering agricultural information: Sources of agricultural information, interviews, coverage of events, abstracting from research and scientific materials. Writing the story: Organizing the material, treatment of the story, writing the news lead and the body, readability measures..

Practical

Practice in interviewing. Covering agricultural events. Abstracting stories from research and scientific materials . Writing different types of agricultural stories. Electing pictures and art work for the agricultural story. Practice in editing, copy reading, headline and title writing, proofreading, lay outing. Visit to a publishing office.

10. Animal Husbandry and Dairying

1	AHD-111	Introductory Animal Husbandry	2(1+1)
2	AHD-121	Livestock , Production and Management	3(2+1)
3	AHD-231	Dairy Technology	3 (2+1)
4	AHD-241	Principles of Food Science and Nutrition	2(1+1)
5	AHD-351	Poultry Production and Management	3(2+1)
6	AHD-3F61	Food Safety and Standards (Elective)	3(2+1)
Total – 16			

1. AHD-111: Introductory Animal Husbandry

2 (1+1)

Theory

Dairy Development in India and their contribution of Indian economy.Mixed farming and IFS (Integrated farming system).Livestock and milk production according to livestock census.Breed- Definition and classification of indigenous and exotic cattle, buffalo, sheep and goat.Breeding method and system of cattle and buffalo. Housing and management of farm- site selection and space requirement for cattle and buffalo, Records kept at farm. Care and management of newly born calf, heifers, pregnant and lactating animals and work bullocks.Milk definition – Method of milking – Hand and machine milking, preservative and common adulterants of milk .Kinds of fodder and their classification.Nutrition- Definition and types of ration and its desirable characteristics. Diseases and their classification – control and preventive measures of Viral (FMD, Rinderpest,), bacterial (Anthrax, HS, Mastitis, brucellosis) , parasitic (tick fever, coccidiosis) Protozoal (Surra), metabolic (Milk fever), sterility and jaundice Diseases.

Practical – Judging of animals and identification of Breeds, visit integrated farm, milking method, computation of balance ration for lactating cow, identification of Disease.

2.AHD-121: Livestock Production and Management

3 (2+1)

Theory

Animal breeding and artificial insemination: Animal breeding-concepts and their application, breed improvement and policy, government and Non-government approaches for breed improvement. Aims of breeder, Mendelian rules and its importance in livestock improvement, Heredity and variation, Elementary idea of essential and accessory organs of male and female reproductive system in different farm animals, Mechanism of gametogenesis and oestrus in farm animals. Artificial Insemination (A.I.), their techniques and its importance in improvement of farm animals, Selection Methods, Sire indexing, cattle breeding problems in India and work so far done in this direction.

Proximate principles of feed and feeding. Nutrients and their functions. Feed ingredients for ration for livestock. Feed supplements and feed additives, conservation of fodder. Customized feeds. Feed formulation and standardization. Elementary idea of digestive system of ruminant and nonruminant farm animals, Evolution of feeding standards, Modern feeding standards, their merits and demerits and applicability under Indian conditions, Ration and its kind, principles of rationing, characteristics of ideal ration, food requirements for growth, reproduction, pregnancy, milk, work and wool production in farm animals, computation of ration. Principles and methods of fodder preservation Hay and Silage Making.

Dairy farm management and health care: Building, Location, Housing principles, space requirements for different species of livestock, various dairy farm buildings. (a) Fodder requirement: of a dairy farm and cropping scheme for the supply of succulent fodders throughout the year, pasture land and their management, Land & labour requirements for a dairy farm, (b) Animal Health & Hygiene: Health and diseases management policy for livestock. Symptoms of ill health principles of immunization, first aid in farm animals. Sterility in farm animals simple obstetrics in farm animals such as abnormal pasteurization, Retention of placenta, prolapse of uterus, milk fever, tympanitis impaction of rumen. Elementary idea about poisoning in farm animals. General measure for prevention and control of infectious and contagious diseases, care of down calves and newly born calf.

Practical

External body parts of cattle, buffalo, sheep, goat, swine. Handling and restraining of livestock. Identification methods of farm animals. Visit to IDF and IPF to study breeds of livestock and daily routine farm operations and farm records. Judging of cattle, buffalo. Culling of livestock. Planning and layout of housing for different types of livestock. Computation of rations for livestock. Formulation of concentrate mixtures. Clean milk production, milking methods. Management of livestock and vaccination. Economics of cattle, buffalo, sheep, goat and swine production.

3. AHD-231: Dairy Technology

3(2+1)

Theory

Definition of milk, Elementary idea of milk secretion, colostrums its nature and properties composition. Physical properties of milk, factors influencing the quality and quantity of milk, PFA/BIS Specifications for different milks, adulteration of milk and its detection.

Milk Processing: Receiving of milk, straining, filtration, clarification, standardization, cooling, pasteurization, sterilization and homogenization, packaging and distribution of milk.

Milk Micro Organism: Classification of microorganism in milk, Fermentation in milk, sources of contamination in milk.

Milk Products: Definition, Composition and production technology of Fat Rich Milk Products like-Cream, Butter and Ghee; Fermented Milk Products such as Dahi and Yoghurt; Frozen Milk Products; Ice-cream and Indigenous Milk Products-Chhena, Paneer, Khoa and Rabari.

Practicals

Sampling of milk, Testing of milk for : (a) Specific gravity by Lactometer.(b) Fat by Garber's method. (c) Solid not fat with the help of formula. (d) Total Solid with the help of Richmond's scale and formula. Determination of acidity in milk. Detection of adulteration of milk. Standardization of milk and cream, fitting and adjusting of cream separator. Manufacture of dairy product such as Butter, Ghee, Dahi, Khoa, Chenna, Rabbari and Ice- cream. Judging of milk and products.

4. AHD-241: Principles of Food Science and Nutrition

2(1+1)

Theory

Definition and classification of food, Food composition (water, carbohydrates, proteins, fats, vitamins, minerals, flavours and colours) and its role. Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods); Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.); Food and nutrition, Malnutrition (over and under nutrition), Nutritional disorders, Balanced/modified diets, Menu planning, New trends in food science and nutrition.

Practical

Evolution ph., acidity, and T.S.S in different food, Estimation of carbohydrate, protein and fat in food. Microbiological Examination of different food samples.

5. AHD-351: Poultry Production and Management

3(2+1)

Theory

Development of poultry industry: Development of poultry industry in India and national poultry improvement plans, Different breeds of chickens for egg and meat production, crosses and their relative importance. **Anatomy and Physiology:** External feature of the Chickens, digestive and reproductive systems, formation and structure of the egg, nutritive value of egg, abnormalities of eggs. **Breeding:** Principles of breeding, Systems of breeding, breeding for egg production and development of strains of broilers selection and Culling, breeding practices. **Incubation of hatching eggs:** Selection handling and care of hatching eggs, natural and artificial incubation, types of incubators, embryo mortality and its cause, Factors affecting successful incubation, testing of eggs during incubation stages of embryo development during incubation 67 stages of embryo development during incubation sexing, vaccination packaging and transportation of day old Chicks.

Brooding of Chicks: Brooding requirements natural and artificial brooding care and management during brooding types of brooders used and their relative importance.

Feeding Principles and Practices: Requirement of nutrients for different age groups of chickens and their sources in the ration composition formulation and preparation of poultry ration for different categories of chickens, various feeding practices used feed additive and supplements.

Housing, Equipment's and Management: Housing system; requirement of house of poultry requirement for different categories of birds, Equipments required in a poultry house, lighting arrangement for poultry,

sanitation of poultry house, vaccination Common poultry disease, their control, prevention and treatment such as New Castle, Chicken pox, coccidiosis, mites and C.R.D. External and internal parasites of Poultry

Practical

Study of external features of male and female chickens. Study of normal and abnormal eggs. Candling for hatching and marketing of the eggs. Debeaking of chickens. Demonstration of dissection of male and female chickens. Hatchery operations, incubation and hatching. Equipment's Formulation of poultry rations for different classes of chickens. Disinfection and litter management of poultry house. Vaccination and deworming of the poultry. Method of sexing of day old chicks. Poultry records on commercial poultry farms. Selection and culling of layers.

6. AHD-361: Food Safety and Standards (Elective)

3(2+1)

Theory

Food Safety- Definition, Importance, Scope and factors affecting food safety. Hazards and risk, types of hazards biological, chemical, physical hazards. Management of hazards-need. Control of parameters. Temperature control. Food storage. Product design, Hygiene and sanitation food service establishments-Introduction. Source of contamination and their control. Waste Disposal. Pest and rodent control. Personnel hygiene. Food Safety Measures. Food safety management tools- Basic concepts. PRPs, GHPs, GMPs, SSOPs etc. HACCP, ISO Series. TQM- concept and need for quality, components of TQM, Kaizen. Risk analysis. Water analysis, surface sanitation and personal hygiene. Food laws and standard – Indian food regulatory regime, FSSAI and other laws and standard related to food. Organic foods. Indian standard for food products.

Practical

Water quality analysis physico-chemical and microbiological. Preparation of different types of media. Assessment of personal hygiene. Biochemical tests for identification of bacteria.

1. NSS/NCC/Rovers and Rangers/Physical Education & Yoga Practices 2 (0+2) NON-GRADUAL COURSES

Theory

Course aims at evoking social consciousness among students through various activities viz., working together, constructive and creative social work, to be skilful in executing democratic leadership, developing skill in programme development to be able for self employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

Following activities are to be taken up under the NSS course:

1. Introduction and basic components of NSS: Orientation
2. NSS programmes and activities
3. Understanding youth
4. Community mobilisation
5. Social harmony and national integration
6. Volunteerism and shramdan

7. Citizenship, constitution and human rights
8. Family and society
9. Importance and role of youth leadership
10. Life competencies
11. Youth development programmes
12. Health, hygiene and sanitation
13. Youth health, lifestyle, HIV AIDS and first aid
14. Youth and yoga
15. Vocational skill development
16. Issues related environment
17. Disaster management
18. Entrepreneurship development
19. Formulation of production oriented project
20. Documentation and data reporting
21. Resource mobilization
22. Additional life skills
23. Activities directed by the Central and State Government

All the activities related to the National Service Scheme course is distributed under four different courses viz., National Service Scheme I, National Service Scheme II, National Service Scheme III and National Service Scheme IV each having one credit load. The entire four courses should be offered continuously for two years. A student enrolled in NSS course should put in at least 60 hours of social work in different activities in a semester other than five regular one day camp in a year and one special camp for duration of 7 days at any semester break period in the two year. Different activities will include orientation lectures and practical works. Activities directed by the Central and State Government have to be performed by all the volunteers of NSS as per direction.

SYLLABUS

Semester I

Course Title: National Service Scheme I

Introduction and basic components of NSS:

Orientation: history, objectives, principles, symbol, badge; regular programmes under NSS, organizational structure of NSS, code of conduct for NSS volunteers, points to be considered by NSS volunteers awareness about health

NSS programmes and activities

Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analysing guiding financial patterns of scheme, youth programme/ schemes of GOI, coordination with different agencies and maintenance of diary

Understanding youth

Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change

Community mobilisation

Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilisation involving youth-adult partnership

Social harmony and national integration

Indian history and culture, role of youth in nation building, conflict resolution and peacebuilding

Volunteerism and shramdan

Indian tradition of volunteerism, its need, importance, motivation and constraints; shramdan as part of volunteerism

Citizenship, constitution and human rights

Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information

Family and society

Concept of family, community (PRIs and other community based organisations) and society

Semester II

Course Title: National Service Scheme II

Importance and role of youth leadership

Meaning, types and traits of leadership, qualities of good leaders; importance and roles of youth leadership

Life competencies

Definition and importance of life competencies, problem-solving and decision-making, inter personal communication

Youth development programmes

Development of youth programmes and policy at the national level, state level and voluntary sector; youth-focused and youth-led organisations

Health, hygiene and sanitation

Definition needs and scope of health education; role of food, nutrition, safe drinking water, water born diseases and sanitation (Swachh Bharat Abhiyan) for health; national health programmes and reproductive health.

Youth health, lifestyle, HIV AIDS and first aid

Healthy lifestyles, HIV AIDS, drugs and substance abuse, home nursing and first aid

Youth and yoga

History, philosophy, concept, myths and misconceptions about yoga; yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative method

Semester III

Course Title: National Service Scheme III

Vocational skill development

To enhance the employment potential and to set up small business enterprises skills of volunteers, a list of 12 to 15 vocational skills will be drawn up based on the local conditions and opportunities. Each volunteer will have the option to select two skill-areas out of this list

Issues related environment

Environmental conservation, enrichment and sustainability, climatic change, natural resource management (rain water harvesting, energy conservation, forestation, waste land development and soil conservations) and waste management

Disaster management

Introduction and classification of disaster, rehabilitation and management after disaster; role of NSS volunteers in disaster management.

Entrepreneurship development

Definition, meaning and quality of entrepreneur; steps in opening of an enterprise and role of financial and support service institution.

Formulation of production oriented project

Planning, implementation, management and impact assessment of project

Documentation and data reporting

Collection and analysis of data, documentation and dissemination of project reports

Semester IV

Course Title: National Service Scheme IV

Youth and crime

Sociological and psychological factors influencing youth crime, cyber crime, peer mentoring in preventing crime and awareness for juvenile justice

Civil/self defence

Civil defence services, aims and objectives of civil defence; needs and training of self defence

Resource mobilisation

Writing a project proposal of self fund units (SFUs) and its establishment

Additional life skills

Positive thinking, self confidence and esteem, setting life goals and working to achieve them, management of stress including time management.

National Cadet Corps Credit hours: 2(0+2)

Semester I: National Cadet Corps

1. Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline.
2. Drill- aim, general words of command, attention, stands at ease, stand easy and turning.
3. Sizing, numbering, forming in three ranks, open and close order march and dressing.
4. Saluting at the halt, getting on parade, dismissing and falling out.
5. Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear.
6. Turning on the march and wheeling. Saluting on the march.
7. Marking time, forward march and halt.
8. Changing step, formation of squad and squad drill.
9. Command and control, organization, badges of rank, honours and awards
10. Nation Building- cultural heritage, religions, traditions and customs of India. National integration.
11. Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizen.
12. Leadership traits, types of leadership. Character/personality development.
13. Civil defense organization, types of emergencies, fire fighting, protection,
14. Maintenance of essential services, disaster management, aid during development projects.
15. Basics of social service, weaker sections of society and their needs, NGO's and their contribution, contribution of youth towards social welfare and family planning.
16. Structure and function of human body, diet and exercise, hygiene and sanitation.
17. Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health.
18. Adventure activities

19. Basic principles of ecology, environmental conservation, pollution and its control.
20. Precaution and general behaviour of girl cadets, prevention of untoward incidents, vulnerable parts of the body, self defense.

Semester II: National Cadet Corps

1. Arms Drill- Attention, stand at ease, stand easy. Getting on parade. Dismissing and falling out. Ground/take up arms, examine arms.
2. Shoulder from the order and vice-versa, present from the order and vice-versa.
3. Saluting at the shoulder at the halt and on the march. Short/long trail from the order and viceversa.
4. Guard mounting, guard of honour, Platoon/Coy Drill.
5. Characteristics of rifle (.22/.303/SLR), ammunition, fire power, stripping, assembling, care, cleaning and sight setting.
6. Loading, cocking and unloading. The lying position and holding.
7. Trigger control and firing a shot. Range Procedure and safety precautions. Aiming and alteration of sight.
8. Theory of groups and snap shooting. Firing at moving targets. Miniature range firing.
9. Characteristics of Carbine and LMG.
10. Introduction to map, scales and conventional signs. Topographical forms and technical terms.
11. The grid system. Relief, contours and gradients. Cardinal points and finding north. Types of bearings and use of service protractor.
12. Prismatic compass and its use. Setting a map, finding north and own position. Map to ground and ground to map.
13. Knots and lashings, Camouflage and concealment, Explosives and IEDs.
14. Field defenses obstacles, mines and mine lying. Bridging, waterman ship
15. Field water supplies, tracks and their construction.
16. Nuclear, Chemical and Biological Warfare (NCBW)
17. Judging distance. Description of ground and indication of landmarks.
18. Recognition and description of target. Observation and concealment. Field signals. Section formations.
19. Fire control orders. Fire and movement. Movement with/without arms. Section battle drill.
20. Types of communication, media, latest trends and developments.

Rovers and Rangers

2(0+2)

Semester I: Rovers and Rangers

1. History, Aims, objectives, organization of Rovers and Rangers and Rovers and Rangers song. cardinals of discipline. Law and promise of Rovers and Rangers
2. Drill- aim, general words of command, attention, stands at ease, stand easy and turning.
3. Sizing, numbering, forming in three ranks, open and close order march and dressing.
4. Saluting at the halt, getting on parade, dismissing and falling out.
5. Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear.
6. Turning on the march and wheeling. Saluting on the march.
7. Marking time, forward march and halt.
8. Changing step, formation of squad and squad drill.
9. Command and control, organization, badges of rank, honours and awards

10. Nation Building- cultural heritage, religions, traditions and customs of India. National integration.

Semester II Rovers and Rangers

1. Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizen.
2. Leadership traits, types of leadership. Character/personality development.
3. Civil defense organization, types of emergencies, fire fighting, protection,
4. Maintenance of essential services, disaster management, aid during development projects.
5. Basics of social service, weaker sections of society and their needs, NGO's and their contribution, Contribution of youth towards social welfare and family planning.
6. Adventure activities
7. Basic principles of ecology, environmental conservation, pollution and its control.

Semester III: Rovers and Rangers

1. Arms Drill- Attention, stand at ease, stand easy. Getting on parade. Dismissing and falling out. Ground/take up arms, examine arms.
2. Camping,
3. Painirring
4. Skil-o-rama
5. Debates
6. Drawing , Essay & Lecture
7. First aid
8. Knots
9. Knowledge of compass, flag marking

Semester IV: Rovers and Rangers

- 1 Community development
2. Report

Note: 1) Compulsory Uniform: According to Rovers and Rangers

Physical Education and Yoga Practices Credit hours: 2(0+2)

Semester I: Physical Education and Yoga Practices

1. Teaching of skills of Football – demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit)
2. Teaching of different skills of Football – demonstration, practice of the skills, correction involvement in game situation (For girls teaching of Tennikoit)
3. Teaching of advance skills of Football – involvement of all the skills in game situation with teaching of rules of the game
4. Teaching of skills of Basketball – demonstration, practice of the skills, correction of skills, involvement in game situation
5. Teaching of skills of Basketball – demonstration, practice of the skills, involvement in game, situation
6. Teaching of skills of Basketball – involvement of all the skills in game situation with teaching of rule of the game
7. Teaching of skills of Kabaddi – demonstration, practice of the skills, correction of skills, involvement in game situation

8. Teaching of skills of Kabaddi – demonstration, practice of the skills, correction of skills, involvement in game situation
9. Teaching of advance skills of Kabaddi – involvement of all the skills in game situation with teaching of rule of the game
10. Teaching of skills of Ball Badminton – demonstration, practice of the skills, correction of skills, involvement in game situation
11. Teaching of skills of Ball Badminton – involvement of all the skills in game situation with teaching of rule of the game
12. Teaching of some of Asanas – demonstration, practice, correction and practice
13. Teaching of some more of Asanas – demonstration, practice, correction and practice
14. Teaching of skills of Table Tennis – demonstration, practice of skills, correction and practice and involvement in game situation
15. Teaching of skills of Table Tennis – demonstration, practice of skills, correction and practice and involvement in game situation
16. Teaching of skills of Table Tennis – involvement of all the skills in game situation with teaching of rule of the game
17. Teaching – Meaning, Scope and importance of Physical Education
18. Teaching – Definition, Type of Tournaments
19. Teaching – Physical Fitness and Health Education
20. Construction and laying out of the track and field (*The girls will have Tennikoit and Throw Ball).

Semester II: Physical Education and Yoga Practices

1. Teaching of skills of Hockey – demonstration practice of the skills and correction.
2. Teaching of skills of Hockey – demonstration practice of the skills and correction. And involvement of skills in games situation
3. Teaching of advance skills of Hockey – demonstration practice of the skills and correction. Involvement of all the skills in games situation with teaching of rules of the game
4. Teaching of skills of Kho-Kho – demonstration practice of the skills and correction.
5. Teaching of skills of Kho-Kho – demonstration practice of the skills and correction. Involvement of the skills in games situation
6. Teaching of advance skills of Kho-Kho – demonstration practice of the skills and correction. Involvement of all the skills in games situation with teaching of rules of the game
7. Teaching of different track events – demonstration practice of the skills and correction.
8. Teaching of different track events – demonstration practice of the skills and correction.
9. Teaching of different track events – demonstration practice of the skills and correction with competition among them.
10. Teaching of different field events – demonstration practice of the skills and correction.
11. Teaching of different field events – demonstration practice of the skills and correction.
12. Teaching of different field events – demonstration practice of the skills and correction.
13. Teaching of different field events – demonstration practice of the skills and correction with competition among them.
14. Teaching of different asanas – demonstration practice and correction.
15. Teaching of different asanas – demonstration practice and correction.

16. Teaching of different asanas – demonstration practice and correction.
17. Teaching of different asanas – demonstration practice and correction.
18. Teaching of weight training – demonstration practice and correction.
19. Teaching of circuit training – demonstration practice and correction.
20. Teaching of calisthenics – demonstration practice and correction.

Note: 1) Compulsory Uniform: Half pants, Tee Shirts, Shoes and socks all white (Girls will have white Tee Shirt and Track pants) **2)** The games mentioned in the practical may be inter changed depending on the season and facilities.

Minimum Standards for Establishing a College of Agriculture

- 1. Degree Nomenclature:** B.Sc. (Hons.) Agriculture
- 2. Eligibility Criteria :**10+2 or intermediate with PCMB, PCB, PCM or Agriculture (P - Physics, C - Chemistry, M - Mathematics, B – Biology) from a recognised Board/university.
- 3. Medium of Instruction:**English and Hindi Both
- 4. Minimum Intake:** 60 students per year
- 5. Divisions/Departments/Sections**
 1. Agronomy
 2. Agricultural Economics and Statistics
 3. Agricultural Extension and Communication
 4. Agricultural Entomology
 5. Genetics and Plant Breeding
 6. Horticulture
 7. Soil Science and Agricultural Chemistry
 9. Plant Pathology
 10. Animal Husbandry and Dairying
 14. Agricultural Engineering

Note: To reduce the number, the subjects which have only one or two courses may be merged with major Division/Department. Colleges/Universities have liberty to do this at their level. However, for practical purposes following model has been proposed giving minimum teaching staff required for each Division/Department taking into account the merger of related subjects.

6. Divisions/Departments/Sections proposed along with Cadre-wise teaching staff required.

- Divisions/Departments**
1. Agronomy
 2. Agricultural Economics
 3. Agriculture Extension and Communication
 4. Agricultural Entomology
 5. Genetics & Plant Breeding
 6. Horticulture
 7. Soil Science and Agricultural Chemistry
 8. Plant Pathology
 9. Agriculture Engineering and Soil Conservation
 10. Animal Husbandry and Dairying .

Note: Total strength after four years should have 45 teachers as faculty. However, in extremecases, it can be 31 and few courses viz. Basic Sciences, and Humanities, Mathematics and ComputerSciences, etc. can be completed by hiring the teachers.

7. Infrastructure facilities (Floor space required)

1. Dean Office	1	20x24		
2. P.A. Room	1	10x12		
3. Committee Room with video conferencing facility	1	20x30		
4. Assistant Administrative Officer including staff	1	20x12		
5. Assistant Accounts Officer including staff	1	20x12		
6. Assistant Academic Officer including staff	1	20x12		
7. Exam Cell (300 capacity)	1	20x12		
8. Evaluation Room	1	20x36		
9. Faculty Room (Ladies)	1	10x12		
10. Faculty Room (Gents)	1	20x12		
11. Placement Cell	1	20x12		
12. Smart Lecture Halls	5	40x30 (60 capacity)		
13. Exam Hall Cum Auditorium	1	100x50		
14. Library/Book Bank	1	30x72		
15. Common Utility Room	1	20x36		
16. Central Laboratory	1	50x36		
17. Hostels including Mess, Gym/Indoor, Reading Room, Warden Room, Store etc.			1 (boys)	150,1
(girls) 150				
18. Canteen		120x12 (kitchen withstore)	20x36 Seating	
19. Wash room (with toilet & urinary facilities)		10 20x12 (keeping ladiesrequirements)		
20. Parking space		As per requirement		
21. Farm stores, threshing yards including implements and tractor sheds, One core, complex				
22. Vehicles Car 1 (Jeep/Car -staff 2, Bus 1, Pickup van 1, Motor Bikes 2, Minibus (30 capacity) 1, Tractors 2				
23. Drinking water and irrigation facilities		As per requirements		
24. Vehicles shed	1	10x80		

Infrastructure facilities (Floor space required)

1. Dean Office	1	20x24		
2. P.A. Room	1	10x12		
3. Committee Room with video conferencing facility	1	20x30		
4. Assistant Administrative Officer including staff	1	20x12		
5. Assistant Accounts Officer including staff	1	20x12		
6. Assistant Academic Officer including staff	1	20x12		
7. Exam Cell (300 capacity)	1	20x12		
8. Evaluation Room	1	20x36		
9. Faculty Room (Ladies)	1	10x12		
10. Faculty Room (Gents)	1	20x12		
11. Placement Cell	1	20x12		
12. Smart Lecture Halls	5	40x30 (60 capacity)		
13. Exam Hall Cum Auditorium	1	100x50		
14. Library/Book Bank	1	30x72		
15. Common Utility Room	1	20x36		
16. Central Laboratory	1	50x36		
17. Hostels including Mess, Gym/Indoor, Reading Room, Warden Room, Store etc.			1 (boys)	150,1
(girls) 150				
18. Canteen		120x12 (kitchen withstore)	20x36 Seating	
19. Wash room (with toilet & urinary facilities)		10 20x12 (keeping ladiesrequirements)		
20. Parking space		As per requirement		
21. Farm stores, threshing yards including implements and tractor sheds, One core, complex				
22. Vehicles Car 1 (Jeep/Car -staff 2, Bus 1, Pickup van 1, Motor Bikes 2, Minibus (30 capacity) 1, Tractors 2				

23. Drinking water and irrigation facilities	As per requirements
24. Vehicles shed	1 10x80

Divisions/Departments/Sections – Requirements

No. Details No. of Rooms Dimensions(ft)

1. Office of Head	11	24x12 with wash room facility
2. Faculty Rooms 1+1	12	12x10 + 18x12 24x10 depending on the strength of each deptt.
3. Clerical/technical staff	12	12x10 to 24x10 depending on the strength of each deptt.
5. Laboratories	12	30x 60 Larger deptt. will have two
6. Field/Lab Stores	5	
1. Agronomy		
2. Genetics and Plant Breeding		
3. Soil Science and Agricultural Chemistry		
4. Horticulture		
5. Pests & Chemicals		
7. Green house/poly house/Nursery facilities (Horticulture Deptt.)		0.02 ha

Requirements of Lab/field equipment for each Division/Department/Section)

1. Agronomy

1. Crop Cafeteria . acre land, small implements like spade, hoe, khurpi, darati etc.
2. Museum for identification of seeds, fertilizer, weeds, commonly used agro-chemical and medicinal and aromatic plants etc.
Storage bottle ,Herbarium posting material
3. Field of sowing method, fertilizer application, irrigation and soil productivity and yield estimation
Small equipment/ implement

Equipment Number

- i. Hot air oven 02
- ii Moisture box 30
- iii Moisture meter 05
- iv Tube Auger 10
- v Bucket auger 10
- vi Weighing Balance 01
- vii Seed Germinator 02
- viii Conductivity Meter 01
- ix pH Meter 02
- x Water Bath 01
- xi Shaker 01
- xii Chlorophyll Meter 01
- xiii Drip and Sprinkler System 03
- xiv Sprayer 03
- xv Spring Balance 50 Kg 05
- xvi Spring Balance 10 Kg 05
- xvii Top Pan Balance 1 kg capacity 05
- xviii Top Pan Balance 2 kg capacity 05
- xix Meter Scale 10
- xx Tape 05
- xxi Brix meter 02

2. Agricultural Economics + (Basic Economics,

Maths & Computer Science and Statistics)

1. Computers 15
2. Camera 01
3. Software As per requirement

3. Agriculture Extension & Communication Lab

1. LCD projector 1
2. Camera (SLR) with zoom, wide-angle, tele-photo lens 1
3. Video camera with tripod, lighting accessories and editing facility 1
4. Computers (workstation) with editing softwares 1
5. Digital voice recorders 5
6. Audio recording-mixing consoles 1
7. Computation softwares for statistics

4. Entomology

1. Binocular Microscope 20
2. Insect Box 60
3. Insect Collection Nets 60
4. Collection Bottles 60
5. Insect Collection Big Boxes for Museum (1 for each order) 29
6. Insecticides for showing students/Representative for each group As per requirement
7. Stereomicroscope 01
8. Electronic Balance 01
9. Soxhlet Extraction Apparatus 01
10. Bee keeping equipment 01 Set
11. Oven 01
12. Patters Tower 01
13. Sprayers 01 of each type
14. Light traps 01 set
15. Fumigation Chamber 01
16. Sides/cover slips as per requirement
17. pH meter 01
18. Computer with printer 01 set

5. Genetics and Plant Breeding + (Crop Physiology, Biotechnology, Seed Science & Technology, Environmental science) lab

1. Microscope 10
2. Binocular microscope 10
3. Electronic Moisture Meter 02
4. Electronic Balance 02
5. Seed Germinator 02
6. Automatic seed/grain counter 01
7. Hot Air Oven 01
8. BOD Incubator 01
9. Fluorescence microscope 01
10. Centrifuge 01
11. Growth Chamber 01
12. Distillation Assembly 01

6. Horticulture Labs (Post Harvest)

- 1 Hand Refractometer 05
- 2 Digital Refractometer 02
- 3 Oven 01
- 4 Refrigerator 01
- 5 Electronic Weighing Balance 02
- 6 Pan Balance (1 kg & 10 kg. capacity each) 02
- 7 Deep Freezer 01
- 8 pH Meter 01
- 9 Fruit crusher 01
- 10 Grinding and Mixing Machine 01

11 Distillation Assembly 01

b. Lab (UG Lab)No. Items Nos.

1. Seed Germinator 02
2. Grafting and budding knife 60
3. Secateur 60
4. Saw 05
5. Loppers 05
6. Mist Chamber 01
7. Poly house with drip irrigation system 02
8. Microscope

7. Agricultural Chemistry and Soil Science + (Biochemistry, Microbiology,)

1. Electronic Top pan balance (0.1 g capacity) 02
2. Electronic Top pan balance (1 mg capacity) 02
3. Hot air oven 02
4. pH Meter 05
5. EC Meter 05
6. Flame Photometer 01
7. Visible spectrophotometer 01
8. Hot Plate 02
9. Distilled water unit 02
10. Water Bath 01
11. Rotary Shaker 02
12. Binocular Microscope 20
13. BOD Incubator 02
14. Autoclave 02
15. Laminar Air Flow 01
16. Microwave oven 01
17. Digestion block 02
18. Hydrometer 05
19. Infiltrometer 02
20. Hydraulic conductivity meter 01
21. Atterberg's limits meter 05
22. Nitrogen Analyser 02
23. GPS 10
24. AWS 01
25. Lysimeter 01
26. Luxmeter 02
27. Solar Pyranometer 01
28. Nitrogen Distillation Unit 01
29. Chromatography equipment-01
30. Soil sampling tools 01 set
31. Moisture box 30
32. Moisture meter 05
33. Tube Auger 10
34. Bucket auger 10
35. Weighing Balance 01
36. Chlorophyll Meter 01
37. Centrifuge machine 01

8. Agricultural Engineering, Soil Conservation, Agro-meteorology and Agroforestry

1. Working models of MB plough, Disk plough and indigenous plough 2 sets each
2. Working model of different harrows Actual
3. Seed drill 01

4. Different types of threshing drums As per requirement
5. Working models of reaper and mowers 02
6. Different types of sprayers and dusters As per requirement
7. Cut model of CI & SI engine 01
8. Cut model of Tractor 01
9. Thermometer Max 05
10. Thermometer Min 05
11. Digital Anemometer 02
12. Cup Anemometer 02
13. Pan Evaporimeter 01
14. Soil thermometer 05 cm. 10 cm. 15 cm. 05, 05, 05,
15. Rain gauge 01
16. Self-recording Rain gauge 01
17. Sunshine Recorder 01
18. Stevenson's Screen 01
19. Thermograph 01
20. Hygrograph 01
21. Soil Heat Flux Plate 01

9. Plant Pathology

1. Microscope compound with photodisplay arrangement 03
2. Sterobinocular 05
3. Sample processing Board (Dry preservation of samples) 04
4. Wet preservation Jars 50
5. Autoclave 02
6. Oven 01
7. Deep Freeze 01
8. Centrifuge (3000 rpm) 01
9. Refrigerator 01
10. Water bath 02
11. Electronic balance 02
12. Weighing machine 01
13. Incubator 02
14. Occular meter 05
15. Stage Micrometer 05
16. Camera Lucida 05

10. Animal Husbandry & Dairy

1. 5000/6500 Feed and Forage Analyzer 01
2. Hand and electric centrifuge 01
3. Analytical balance 01
4. Hot air oven 01
5. Micro kjeldahl N digestion & distillation apparatus 01
6. Soxhlet unit for fat estimation 01
7. Hot plate, Fiber Tech. 01
8. Vacuum pump 01
9. Willy mill grinder 01
10. Platform balance (100 kg cap) 01
11. Gerber centrifuge unit (for milk fat testing) 01
12. Milk analyzer (automatic) 01
13. Crude fiber estimation unit 01
14. Distilled water unit 01
15. Incubator cum hatcher 01
16. Brooder machine 01

17. Feeder 01
18. Waterer 01
19. Egg candling machine 01
20. Debeaker 01
21. Vaccinator 01
22. Milking machine As per requirements
23. Milking bucket As per requirement
24. Milking can As per requirements
25. Animal and bird identification tools As per requirement
26. Chaff cutter 01
27. Lactometer 01
28. Castrator 01
29. Shearer 01
30. Electric dehorner 01
31. Artificial vagina 01
32. Common medication device 01
33. Cattle crate 01

11. Central Library and Information System

- | | |
|---|----|
| 1. Internet Server | 01 |
| 2. Intranet Server | 01 |
| 3. Computers for Reading Hall | 20 |
| 4. Heavy Duty Photocopiers | 02 |
| 5. Computerized Issue and Catalogue Systems | 02 |
| 6. Wi-Fi facility in college/library/hostels As per requirement | |
| 7. CCTV monitoring system for library | 01 |
| 8. RFID and Access Control System (Optional) | 01 |
| 9. Broadband Internet Connectivity with minimum speed of 1Gbps | |
