Study &Evaluation Scheme

of

Bachelor of Science (Agriculture)

[Applicable w.e.f. Academic Session 2017-18]

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in

Registrar

TEERHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)
Delhi Road, Bagarpur, Moradabad (U.P)

Study & Evaluation Scheme
Bachelor of Science
SUMMARY

Programme	:	B.Sc. (Agriculture)
Duration	:	Four-year full time (Eight Semesters)
Medium	:	English/Hindi
Minimum Required Attendance	:	75 %
Credit		
Maximum Credit	:	193
Minimum credit required for the degree	:	185

Assessment :

Internal	External	Total
40	60	100

Internal Evaluation (Theory Papers)

Class Test I	Class Test II	Class Test III	Assignment(s)	Attendance	Total
Best two out of three					
10 Marks	10 Marks	10 Marks	10 Marks	10 Marks	40 Marks

Evaluation of Practical :

Internal	External	Total
50	50	100

Evaluation of Seminar/Viva :

Internal	External	Total
50	50	100

Duration of Examination :

External	Internal
3 hrs.	$1\frac{1}{2}$hrs

(To qualify the course a student is required to secure a minimum of 45% marks in aggregate in each course including the semester-end examination and the teacher's continuous evaluation shall be essential for passing the course and earning its assigned credits. A candidate, who secures less than 45% marks in a course, shall be deemed to have failed in that course.)

Question Paper Structure

1. *The question paper shall consist of six questions. All six are compulsory. First question shall be of short answer type (not exceeding 50 words). Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 2 marks each).*
2. *Remaining five questions will be one from each unit with internal choice. The student has to answer one of the two in each question. The weightage of Question No. 2 to 6 shall be 10 marks each.*

Usually each question in the examination should be designed to have a numerical component, where part of syllabus.

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SEMESTER- I, 2017-2018

TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE

Teerthanker Mahaveer University

Sr. No.	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1.	BAG 107	Fundamentals of Agronomy	3	-	-	3	40	60	100
2.	BAG 102	Fundamentals of Soil Science	2	-	-	2	40	60	100
3.	BAG 104	Fundamentals of Horticulture	1	-	-	1	40	60	100
4.	BAG 108	Introduction to Forestry	1	-	-	1	40	60	100
5.	BAG 109	Fundamentals of Plant Biochemistry and Biotechnology	2	-	-	2	40	60	100
6.	BAG 110	Rural Sociology & Educational Psychology	2	-	-	2	40	60	100
7.	BAG 111	Introductory Biology*	1	-	-	1	40	60	100
	BAG 112	Elementary Mathematics*	2	-	-	2	40	60	100
8.	BAG 113	Agricultural Heritage	1	-	-	1	40	60	100
9.	BAG 199	English Communication & Soft Skills-I	3	-	2	4	50	50	100
10.	BAG 154	Fundamentals of Agronomy Practical	-	-	2	1	50	50	100
11.	BAG 152	Fundamentals of Soil Science Practical	-	-	2	1	50	50	100
12.	BAG 153	Fundamentals of Horticulture Practical	-	-	2	1	50	50	100
13.	BAG 155	Introduction to Forestry Practical	-	-	2	1	50	50	100
14.	BAG 156	Fundamentals of Plant Biochemistry and Biotechnology Practical	-	-	2	1	50	50	100
15.	BAG 157	Introductory Biology Practical	-	-	2	1	50	50	100
		Total	**18**	**-**	**14**	**25**	**710**	**890**	**1600**

*** R: Remedial Courses**

Students having Biology at intermediate (10+2) will register for Elementary Mathematics (BAG108) and students having Mathematics will register for Introductory Biology (BAG107) and other students will choose any one from above two courses.

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COURSE OUTLINE AND SYLLABUS OF B.Sc. AGRICULTURE

SEMESTER- II

TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES

Teerthanker Mahaveer University

Sr. No.	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1.	BAG 207	Fundamentals of Genetics	2	-	-	2	40	60	100
2.	BAG 208	Fundamentals of Plant Pathology and Agricultural Microbiology	3	-	-	3	40	60	100
3.	BAG 209	Soil and Water Conservation	1	-	-	1	40	60	100
4.	BAG 210	Fundamentals of Crop Physiology	1	-	-	1	40	60	100
5.	BAG 211	Fundamentals of Entomology	3	-	-	3	40	60	100
6.	BAG 212	Fundamentals of Agricultural Extension Education	3	-	-	3	40	60	100
7.	BAG 213	Fundamentals of Agricultural Economics	2	-	-	2	40	60	100
8.	BAG 231	Computer Fundamentals, Internet, MS-Office	4	-	-	4	40	60	100
9.	BAG 299	English Communication & Soft Skills-II	3	-	2	4	50	50	100
10.	BAG 253	Fundamentals of Genetics Practical	-	-	2	1	50	50	100
11	BAG 254	Fundamentals of Plant Pathology and Agricultural Microbiology Practical	-	-	2	1	50	50	100
12	BAG 255	Soil and Water Conservation Practical	-	-	2	1	50	50	100
13	BAG 256	Fundamentals of Crop Physiology Practical	-	-	2	1	50	50	100
14.	BAG 257	Fundamentals of Entomology Practical	-	-	2	1	50	50	100
15	BAG 258	Fundamentals of Agricultural Extension Education Practical	-	-	2	1	50	50	100
		Total	**22**	**-**	**14**	**29**	**710**	**890**	**1500**

COURSE OUTLINE AND SYLLABUS OF B.Sc. AGRICULTURE
SEMESTER- III
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Sr. No.	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1.	BAG 308	Crop Production Technology – I *(Kharif Crops)*	1	-	-	1	40	60	100
2.	BAG 309	Fundamentals of Plant Breeding	1	-	-	1	40	60	100
3.	BAG 310	Agricultural Finance, Cooperation and Agri- Informatics	3	-	-	3	40	60	100
4.	BAG 311	Principles of Seed Technology	1	-	-	1	40	60	100
5.	BAG 312	Production Technology for Vegetables and Spices	1	-	-	1	40	60	100
6.	TMU – X01/BAG 801	Environmental Studies	4	-	-	4	40	60	100
7.	BAG 314	Statistical Methods	1	-	-	1	40	60	100
8.	BAG 315	Livestock and Poultry Management	1	-	-	1	40	60	100
9.	BAG 399	English Communication & Soft Skills-III	3	-	2	4	50	50	100
10.	BAG 358	Crop Production Technology – I *(Kharif Crops)* Practical	-	-	2	1	50	50	100
11	BAG 359	Fundamentals of Plant Breeding Practical	-	-	2	1	50	50	100
12	BAG 360	Agricultural Finance, Cooperation and Agri- Informatics Practical	-	-	2	1	50	50	100
13.	BAG 361	Principles of Seed Technology Practical	-	-	2	1	50	50	100
14.	BAG 362	Production Technology for Vegetables and Spices Practical	-	-	2	1	50	50	100
16.	BAG 364	Statistical Methods	-	-	2	1	50	50	100

		Practical							
17.	BAG 365	Livestock and Poultry Management Practical	-	-	2	1	50	50	100
18.	BAG 366	National Service Scheme	-	-	2	1	100	-	100
	Total		**16**	**-**	**18**	**25**	**820**	**880**	**1700**

COURSE OUTLINE AND SYLLABUS OF B.Sc. AGRICULTURE
SEMESTER- IV
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Sr. No.	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1.	BAG-410	Crop Production Technology –II *(Rabi Crops)*	2	-	-	2	40	60	100
2.	BAG-411	Production Technology for Ornamental Crops, Fruit crops, Plantation crops, MAP and Landscaping	3	-	-	3	40	60	100
3.	BAG-408	Farm Machinery and Power	1	-	-	1	40	60	100
4.	BAG-412	Agricultural Marketing Trade & Prices	1	-	-	1	40	60	100
5.	BAG-413	Introductory Agro-meteorology & Climate Change	1	-	-	1	40	60	100
6.	BAG-414	Farming System & Sustainable Agriculture	1	-	-	1	40	60	100
7.	BAG-499	English Communication & Soft Skills-IV	3	-	2	4	50	50	100
8.	BAG 415/BAG 8E2	Renewable Energy and Green Technology	1	-	-	1	40	60	100
9.	BAG-455	Crop Production Technology –II *(Rabi Crops)*	-	-	2	1	50	50	100
10.	BAG-456	Production Technology for Ornamental Crops, Fruit Plantation Crops MAPs and	-	-	2	1	50	50	100

		Landscaping Practical							
11.	BAG-457	Farm Machinery and Power Practical	-	-	2	1	50	50	100
12.	BAG-458	Agricultural Marketing Trade & Prices Practical	-	-	2	1	50	50	100
13.	BAG-459	Introductory Agro-meteorology & Climate Change Practical	-	-	2	1	50	50	100
14.	BAG-460	Renewable Energy and Green Technology Practical	-	-	2	1	50	50	100
	Elective Courses								
1	BAGE401	Agribusiness Management	1	-	-	**1**	**40**	**60**	**100**
2	BAGE402	Agrochemicals	1	-	-	**1**	**40**	**60**	**100**
3	BAGE403	Commercial Plant Breeding	1	-	-	**1**	**40**	**60**	**100**
4	BAGE404	Landscaping	1	-	-	**1**	**40**	**60**	**100**
5	BAGE451	Agribusiness Management Practical	-	-	**2**	**1**	**50**	**50**	**100**
6	BAGE452	Agrochemicals Practical	-	-	**2**	**1**	**50**	**50**	**100**
7	BAGE453	Commercial Plant Breeding Practical	-	-	**2**	**1**	**50**	**50**	**100**
8	BAGE454	Landscaping Practical	-	-	**2**	**1**	**50**	**50**	**100**
	Total		**16**	-	**20**	**26**	**900**	**1100**	**2000**

A student has to register 3 elective courses in the IV semester

COURSE OUTLINE AND SYLLABUS OF B.Sc. AGRICULTURE

SEMESTER- V

TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES

Teerthanker Mahaveer University

Sr. No.	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1.	BAG-509	Principles of Integrated Pest and Disease Management	1	-	-	1	40	60	100
2.	BAG-510	Manures, Fertilizers and Soil Fertility Management	1	-	-	1	40	60	100
3.	BAG-511	Pests of Crops and Stored Grain and their Management and Management of Beneficial insects	2	-	-	2	40	60	100
4.	BAG-512	Diseases of Field and Horticultural Crops and their Management -I	1	-	-	1	40	60	100
5.	BAG-513	Crop Improvement-I *(Kharif Crops)*	1	-	-	1	40	60	100
6.	BAG-514	Entrepreneurship Development and Business Communication	1	-	-	1	40	60	100
7.	BAG-515	Geoinformatics and Nano-technology and Precision Farming	1	-	-	1	40	60	100
8.	BAG-516	Intellectual Property Rights	1	-	-	1	40	60	100
9.	BAG-555	Principles of Integrated Pest and Disease Management Practical	-	-	2	1	50	50	100
10.	BAG-556	Manures, Fertilizers and Soil Fertility Management Practical	-	-	2	1	50	50	100
11.	BAG-557	Pests of Crops and Stored Grain and their Management and Management of	-	-	2	1	50	50	100

		Beneficial insects Practical							
12.	BAG-558	Diseases of Field and Horticultural Crops and their Management –I Practical	-	-	2	1	50	50	100
13.	BAG-559	Crop Improvement-I *(Kharif Crops)* Practical	-	-	2	1	50	50	100
14.	BAG-560	Entrepreneurship Development and Business Communication Practical	-	-	2	1	50	50	100
15.	BAG-561	Geoinformatics and Nano-technology and Precision Farming Practical	-	-	2	1	50	50	100
16.	BAG-562	Practical Crop Production – I (*Kharif* crops)	-	-	2	1	50	50	100
17.	BAG-563	Physical Education and Yoga Practices-I	-	-	2	1	100	-	100
Elective Courses									
1	BAGE 501	Food Safety and Standards	1	-	-	1	40	60	100
2	BAGE 502	Biopesticides and Biofertilizers	1	-	-	1	40	60	100
3	BAGE 503	Protected Cultivation	1	-	-	1	40	60	100
4	BAGE 504	Micro propogation and Technologies	1	-	-	1	40	60	100
5	BAGE 551	Food Safety and Standards Practical	-	-	2	1	50	50	100
6	BAGE 552	Biopesticides and Biofertilizers Practical	-	-	2	1	50	50	100
7	BAGE 553	Protected Cultivation Practical	-	-	2	1	50	50	100
8	BAGE 554	Micro propogation and Technologies Practical	-	-	2	1	50	50	100
		Total Credit	**12**	**-**	**24**	**24**	**1090**	**1210**	**2300**

A student has to register 3 elective courses in the V semester

COURSE OUTLINE AND SYLLABUS OF B.Sc. AGRICULTURE
SEMESTER- VI
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Sr. No.	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1.	BAG-607	Rainfed Agriculture, Watershed Management and Organic Farming	1	-	-	1	40	60	100
2.	BAG-608	Protected Cultivation and Secondary Agriculture	1	-	-	1	40	60	100
3.	BAG-609	Diseases of Field and Horticultural Crops and their Management-II	2	-	-	2	40	60	100
4.	BAG-610	Post-harvest Management and Value Addition of Fruits and Vegetables	1	-	-	1	40	60	100
5.	BAG-611	Crop Improvement-II *(Rabi crops)*	1	-	-	1	40	60	100
6.	BAG-612	Farm Management, Production & Resource Economics	1	-	-	1	40	60	100
7.	BAG-613	Problematic Soils and their Management	2	-	-	1	40	60	100
8.	BAG-614	Principles of Food Science and Nutrition	1	-	-	1	40	60	100
9.	BAG-657	Rainfed Agriculture and Watershed Management and Organic Farming Practical	-	-	2	1	50	50	100
10.	BAG-658	Protected Cultivation and Secondary Agriculture Practical	-	-	2	1	50	50	100

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11.	BAG-659	Diseases of Field and Horticultural Crops and their Management-II Practical	-	-	2	1	50	50	100
12.	BAG-660	Post-harvest Management and Value Addition of Fruits and Vegetables Practical	-	-	2	1	50	50	100
13.	BAG-661	Crop Improvement-II *(Rabi crops)* Practical	-	-	2	1	50	50	100
14.	BAG-662	Farm Management, Production & Resource Economics Practical	-	-	2	1	50	50	100
15	BAG-663	Practical Crop Production –II (*Rabi* crops)	-	-	2	1	50	50	100
16	BAG-664	Educational Tour	-	-	2	1	100	-	100
		Elective Courses							
1	BAGE 601	Hi-tech. Horticulture	1	-	-	1	40	60	100
2	BAGE 602	Weed Management	1	-	-	1	40	60	100
3	BAGE 603	System Simulation and Agro-advisory	1	-	-	1	40	60	100
4	BAGE 604	Agricultural Journalism	1	-	-	1	40	60	100
5	BAGE 651	Hi-tech. Horticulture Practical	-	-	2	1	50	50	100
6	BAGE 652	Weed Management Practical	-	-	2	1	50	50	100
7	BAGE 653	System Simulation and Agro-advisory Practical	-	-	2	1	50	50	100
8	BAGE 654	Agricultural Journalism Practical	-	-	2	1	50	50	100
	Total		**13**	-	**22**	**24**	1040	1160	2200

A student has to register 3 elective courses in the VI semester

COURSE OUTLINE AND SYLLABUS OF B.Sc. AGRICULTURE
SEMESTER- VII
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

VII Semester			
Sr.No.	**Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)-BAG-754**		
	Activities	**No. of weeks**	**Credit Hours**
1	General orientation & On campus training by different faculties	1	14
2	Village attachment	8	
	Unit attachment in Univ./ College. KVK/ Research Station Attachment	5	
3	Plant clinic	2	02
	Agro-Industrial Attachment	3	04
4	Project Report Preparation, Presentation and Evaluation	1	
Total weeks for RAWE & 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

Sr. 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	
7	Animal Production Interventions	1 week
8	Extension and Transfer of Technology activities	1 week

CBCS Based Study &Evaluation Scheme

(As per ICAR Fifth Deans' Committee Recommendations)

of

Bachelor of Science (Hons.) Agriculture

[Applicable w.e.f. Academic Session 2019-2020 till revised]

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

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COURSE OUTLINE AND SYLLABUS OF B.Sc. (Hons.) AGRICULTURE
SEMESTER- I
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1.	CC	BAG 107	Fundamentals of Agronomy	3	-	-	3	40	60	100
2.	CC	BAG 102	Fundamentals of Soil Science	2	-	-	2	40	60	100
3.	CC	BAG 104	Fundamentals of Horticulture	1	-	-	1	40	60	100
4.	CC	BAG 108	Introduction to Forestry	1	-	-	1	40	60	100
5.	CC	BAG 109	Fundamentals of Plant Biochemistry and Biotechnology	2	-	-	2	40	60	100
6.	CC	BAG 110	Rural Sociology & Educational Psychology	2	-	-	2	40	60	100
7.	CC	BAG 113	Agricultural Heritage	1	-	-	1	40	60	100
8.	AEC	TMUGE 114	English Communication-I	2	-	2	3	40	60	100
9.	CC	BAG 154	Fundamentals of Agronomy Practical	-	-	2	1	50	50	100
10.	CC	BAG 152	Fundamentals of Soil Science Practical	-	-	2	1	50	50	100
11.	CC	BAG 153	Fundamentals of Horticulture Practical	-	-	2	1	50	50	100
12.	CC	BAG 155	Introduction to Forestry Practical	-	-	2	1	50	50	100
13.	CC	BAG 156	Fundamentals of Plant Biochemistry and Biotechnology Practical	-	-	2	1	50	50	100
14.	RC*	BAG 111 **AND** BAG 157 **OR** BAG 112	Introductory Biology **AND** Introductory Biology Practical **OR** Elementary Mathematics	1/2		2/0	2	90/40	110/60	200/100
			Total*	**15/16**		**14/12**	**22**	**660/610**	**840/790**	**1500/1400**

* RC: Students having Biology at intermediate (10+2) will opt Elementary Mathematics (BAG 112) and students having Mathematics will opt Introductory Biology (BAG111 and BAG 157). Other students can choose any one of these. Maximum marks for those students who opt Introductory Biology (BAG111 and BAG 157) will be 1500 (660 internal+840 external) and for those who opt Elementary Mathematics (BAG 112) will be 1400 (610 internal+790 external).

COURSE OUTLINE AND SYLLABUS OF B.Sc. (Hons.) AGRICULTURE
SEMESTER- II
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1.	CC	BAG 207	Fundamentals of Genetics	2	-	-	2	40	60	100
2.	CC	BAG 208	Fundamentals of Plant Pathology and Agricultural Microbiology	3	-	-	3	40	60	100
3.	CC	BAG 209	Soil and Water Conservation Engineering	1	-	-	1	40	60	100
4.	CC	BAG 210	Fundamentals of Crop Physiology	1	-	-	1	40	60	100
5.	CC	BAG 211	Fundamentals of Entomology	3	-	-	3	40	60	100
6.	CC	BAG 212	Fundamentals of Agricultural Extension Education	3	-	-	3	40	60	100
7.	CC	BAG 213	Fundamentals of Agricultural Economics	2	-	-	2	40	60	100
8.	AEC	BAG 231	Computer Fundamentals, Internet, MS-Office	4	-	-	4	40	60	100
9.	AEC	TMUGE 232	English Communication-II	2	-	2	3	40	60	100
10.	CC	BAG 253	Fundamentals of Genetics Practical	-	-	2	1	50	50	100
11	CC	BAG 254	Fundamentals of Plant Pathology and Agricultural Microbiology Practical	-	-	2	1	50	50	100
12	CC	BAG 255	Soil and Water Conservation Engineering Practical	-	-	2	1	50	50	100
13	CC	BAG 256	Fundamentals of Crop Physiology Practical	-	-	2	1	50	50	100
14.	CC	BAG 257	Fundamentals of Entomology Practical	-	-	2	1	50	50	100
15	CC	BAG 258	Fundamentals of Agricultural Extension Education Practical	-	-	2	1	50	50	100
			Total	**21**		**14**	**28**	**660**	**840**	**1500**

COURSE OUTLINE AND SYLLABUS OF B.Sc. (Hons.) AGRICULTURE
SEMESTER- III
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1.	CC	BAG 308	Crop Production Technology – I *(Kharif Crops)*	1	-	-	1	40	60	100
2.	CC	BAG 309	Fundamentals of Plant Breeding	2	-	-	2	40	60	100
3.	CC	BAG 310	Agricultural Finance and Cooperation	2	-	-	2	40	60	100
4.	CC	BAG 312	Production Technology for Vegetables and Spices	1	-	-	1	40	60	100
5.	AEC	BAG 313	Environmental Studies and Disaster Management	2	-	-	2	40	60	100
6.	CC	BAG 314	Statistical Methods	1	-	-	1	40	60	100
7.	CC	BAG 315	Livestock and Poultry Management	3	-	-	3	40	60	100
8.	CC	BAG 316	Agri- Informatics	1	-	-	1	40	60	100
9.	CC	BAG 317	Farm Machinery and Power	1	-	-	1	40	60	100
10.	AEC	TMUGE 314	English Communication-III	2	-	-	2	40	60	100
11.	CC	BAG 358	Crop Production Technology – I *(Kharif Crops)* Practical	-	-	2	1	50	50	100
12.	CC	BAG 359	Fundamentals of Plant Breeding Practical	-	-	2	1	50	50	100
13.	CC	BAG 360	Agricultural Finance and Cooperation Practical	-	-	2	1	50	50	100
14.	CC	BAG 362	Production Technology for Vegetables and Spices Practical	-	-	2	1	50	50	100
15.	CC	BAG 364	Statistical Methods Practical	-	-	2	1	50	50	100
16.	CC	BAG 365	Livestock and Poultry Management Practical	-	-	2	1	50	50	100
17.	CC	BAG 367	Agri- Informatics Practical	-	-	2	1	50	50	100
18.	AEC	BAG 368	Environmental Studies and Disaster Management Practical	-	-	2	1	50	50	100

19.	CC	BAG 369	Farm Machinery and Power Practical	-	-	2	1	50	50	100
20.	AEC	BAG 370	# Physical Education & Yoga Practices	-	-	2	1	100	-	100
			Total	**16**		**20**	**26**	**950**	**1050**	**2000**

#NSS/NCC/ Physical Education & Yoga Practices: These courses are non-gradial. The College offers Physical Education & Yoga Practices in III and IV semesters. The duration of NSS is two years (4 semester) and Physical Education & Yoga Practices of one year (2 semesters). Students have to opt either NSS or Physical Education & Yoga Practices.

COURSE OUTLINE AND SYLLABUS OF B.Sc. (Hons.) AGRICULTURE
SEMESTER- IV
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1.	CC	BAG 410	Crop Production Technology – II *(Rabi Crops)*	1	-	-	1	40	60	100
2.	CC	BAG 411	Production Technology for Ornamental Crops, MAP and Landscaping	1	-	-	1	40	60	100
3.	CC	BAG 412	Agricultural Marketing Trade & Prices	2	-	-	2	40	60	100
4.	CC	BAG 413	Introductory Agro-meteorology & Climate Change	1	-	-	1	40	60	100
5.	CC	BAG 414	Farming System & Sustainable Agriculture	1	-	-	1	40	60	100
6.	CC	BAG 415	Renewable Energy and Green Technology	1	-	-	1	40	60	100
7.	CC	BAG 416	Problematic Soils and their Management	2	-	-	2	40	60	100
8.	CC	BAG 417	Production Technology for Fruit and Plantation Crops	1	-	-	1	40	60	100
9.	CC	BAG 418	Principles of Seed Technology	1	-	-	1	40	60	100
10.	AEC	BAG 419	Human Values & Ethics	1	-	-	1	40	60	100
11.	AEC	TMUGE 414	English Communication-IV	2	-	-	2	40	60	100
12.	CC	BAG 455	Crop Production Technology – II *(Rabi Crops)*Practical	-	-	2	1	50	50	100
13.	CC	BAG 456	Production Technology for Ornamental Crops, MAPs and Landscaping Practical	-	-	2	1	50	50	100
14.	CC	BAG 458	Agricultural Marketing Trade & Prices Practical	-	-	2	1	50	50	100
15.	CC	BAG 459	Introductory Agro-meteorology & Climate Change Practical	-	-	2	1	50	50	100
16.	CC	BAG 460	Renewable Energy and Green Technology Practical	-	-	2	1	50	50	100
17.	CC	BAG 461	Production Technology for Fruit and Plantation Crops Practical	-	-	2	1	50	50	100
18.	CC	BAG 462	Principles of Seed Technology Practical	-	-	4	2	50	50	100
19.	AEC	BAG 470	# Physical Education & Yoga Practices	-	-	2	1	100	-	100
20.	DSEC	Select one theory course and its practical from		2		2	3	90	110	200

		Table 1								
			Total	**16**		**20**	**26**	**980**	**1120**	**2100**

Table 1: Discipline Specific Elective Courses (DSEC): Select any one-

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSEC	BAGE 401	Agribusiness Management	2	-	-	2	40	60	100
2	DSEC	BAGE 402	Agrochemicals	2	-	-	2	40	60	100
3	DSEC	BAGE 403	Commercial Plant Breeding	2	-	-	2	40	60	100
4	DSEC	BAGE 404	Landscaping	2	-	-	2	40	60	100
5	DSEC	BAGE 451	Agribusiness Management Practical	-	-	2	1	50	50	100
6	DSEC	BAGE 452	Agrochemicals Practical	-	-	2	1	50	50	100
7	DSEC	BAGE 453	Commercial Plant Breeding Practical	-	-	2	1	50	50	100
8	DSEC	BAGE 454	Landscaping Practical	-	-	2	1	50	50	100

#NSS/NCC/ Physical Education & Yoga Practices: These courses are non-gradial. The College offers Physical Education & Yoga Practices in III and IV semesters. The duration of NSS is two years (4 semester) and Physical Education & Yoga Practices of one year (2 semesters). Students have to opt either NSS or Physical Education & Yoga Practices.

*The student has to take the theory and practical of the same course

COURSE OUTLINE AND SYLLABUS OF B.Sc. (Hons.) AGRICULTURE
SEMESTER- V
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1.	CC	BAG 509	Principles of Integrated Pest and Disease Management	2	-	-	2	40	60	100
2.	CC	BAG 510	Manures, Fertilizers and Soil Fertility Management	2	-	-	2	40	60	100
3.	CC	BAG 511	Pests of Crops and Stored Grain and their Management	2	-	-	2	40	60	100
4.	CC	BAG 512	Diseases of Field and Horticultural Crops and their Management -I	2	-	-	2	40	60	100
5.	CC	BAG 513	Crop Improvement-I *(Kharif Crops)*	1	-	-	1	40	60	100
6.	CC	BAG 514	Entrepreneurship Development and Business Communication	1	-	-	1	40	60	100
7.	CC	BAG 515	Geoinformatics, Nano-technology and Precision Farming	1	-	-	1	40	60	100
8.	CC	BAG 516	Intellectual Property Rights	1	-	-	1	40	60	100
9.	CC	BAG-555	Principles of Integrated Pest and Disease Management Practical	-	-	2	1	50	50	100
10.	CC	BAG 556	Manures, Fertilizers and Soil Fertility Management Practical	-	-	2	1	50	50	100
11.	CC	BAG-557	Pests of Crops and Stored Grain and their Management Practical	-	-	2	1	50	50	100
12.	CC	BAG 558	Diseases of Field and Horticultural Crops and their Management –I Practical	-	-	2	1	50	50	100
13.	CC	BAG 559	Crop Improvement-I *(Kharif Crops)*Practical	-	-	2	1	50	50	100
14.	CC	BAG 560	Entrepreneurship Development and Business Communication Practical	-	-	2	1	50	50	100
15.	CC	BAG 561	Geoinformatics and Nano-	-	-	2	1	50	50	100

			technology and Precision Farming Practical							
16.	SEC	BAG 562	Practical Crop Production – I (*Kharif* crops)	-	-	4	2	100	-	100
17.	VAC	TMUGS 501	Managing Self*	2	1	-	-	50	50	100
18.	DSE C	Select one theory course and its practical from Table 2**		2		2	3	90	110	200
19.	OEC-1	MOOC Course ***		-		-	-	-	-	-
			Total	**16**	**1**	**20**	**24**	**910**	**990**	**1900**

Table 2: Discipline Specific Elective Courses (DSEC): Select any ONE-

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSEC	BAGE 501	Food Safety and Standards	2	-	-	2	40	60	100
2	DSEC	BAGE 502	Biopesticides and Biofertilizers	2	-	-	2	40	60	100
3	DSEC	BAGE 503	Protected Cultivation	2	-	-	2	40	60	100
4	DSEC	BAGE 504	Micro propagation and Technologies	2	-	-	2	40	60	100
5	DSEC	BAGE 551	Food Safety and Standards Practical	-	-	2	1	50	50	100
6	DSEC	BAGE 552	Biopesticides and Biofertilizers Practical	-	-	2	1	50	50	100
7	DSEC	BAGE 553	Protected Cultivation Practical	-	-	2	1	50	50	100
8	DSEC	BAGE 554	Micro propagation and Technologies Practical	-	-	2	1	50	50	100

*Non-gradial course: This course is taught by Centre for Teaching Learning and Development (CTLD) to enhance soft skills in students. In the 50 marks internal 10 marks for attendance+40 marks for continuous evaluation process

**The student has to take the theory and practical of the same course

***Open elective course (OEC) is a MOOC course of eight week (minimum). This course is mandatory to qualify for the award of degree. The students have to submit the certificate of the MOOC to the University.

COURSE OUTLINE AND SYLLABUS OF B.Sc. (Hons.) AGRICULTURE
SEMESTER- VI
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1.	CC	BAG-607	Rainfed Agriculture & Watershed Management	1	-	-	1	40	60	100
2.	CC	BAG-608	Protected Cultivation and Secondary Agriculture	1	-	-	1	40	60	100
3.	CC	BAG-609	Diseases of Field and Horticultural Crops and their Management-II	2	-	-	2	40	60	100
4.	CC	BAG-610	Post-harvest Management and Value Addition of Fruits and Vegetables	1	-	-	1	40	60	100
5.	CC	BAG-611	Crop Improvement-II *(Rabi crops)*	1	-	-	1	40	60	100
6.	CC	BAG-612	Farm Management, Production & Resource Economics	1	-	-	1	40	60	100
7.	CC	BAG-614	Principles of Food Science and Nutrition	2	-	-	2	40	60	100
8.	CC	BAG-615	Principles of Organic Farming	1	-	-	1	40	60	100
9.	CC	BAG-616	Management of Beneficial Insects	1	-	-	1	40	60	100
10.	CC	BAG-657	Rainfed Agriculture & Watershed Management Practical	-	-	2	1	50	50	100
11.	CC	BAG-658	Protected Cultivation and Secondary Agriculture Practical	-	-	2	1	50	50	100
12.	CC	BAG-659	Diseases of Field and Horticultural Crops and their Management-II Practical	-	-	2	1	50	50	100
13.	CC	BAG-660	Post-harvest Management and Value Addition of Fruits and Vegetables Practical	-	-	2	1	50	50	100
14.	CC	BAG-661	Crop Improvement-II *(Rabi crops)* Practical	-	-	2	1	50	50	100
15.	CC	BAG-662	Farm Management, Production & Resource Economics Practical	-	-	2	1	50	50	100
16.	SEC	BAG-663	Practical Crop Production –II (*Rabi* crops)	-	-	4	2	50	50	100

17.	CC	BAG-665	Principles of Organic Farming Practical	-	-	2	1	50	50	100
18.	CC	BAG-666	Management of Beneficial Insects Practical	-	-	2	1	50	50	100
19.	VAC	TMUGS-601	Managing Work and Others*	2	1	-	-	50	50	100
20.	DSEC	Select one theory course and its practical from Table 3**		2		2	3	90	110	200
21.	OEC-2	MOOC Course***		-		-	-	-	-	-
			Total	**15**	**1**	**22**	**24**	**950**	**1150**	**2100**

Table 3: Discipline Specific Elective Courses (DSEC): Select any one-

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSEC	BAGE 601	Hi-tech. Horticulture	2	-	-	2	40	60	100
2	DSEC	BAGE 602	Weed Management	2	-	-	2	40	60	100
3	DSEC	BAGE 603	System Simulation and Agro-advisory	2	-	-	2	40	60	100
4	DSEC	BAGE 604	Agricultural Journalism	2	-	-	2	40	60	100
5	DSEC	BAGE 651	Hi-tech. Horticulture Practical	-	-	2	1	50	50	100
6	DSEC	BAGE 652	Weed Management Practical	-	-	2	1	50	50	100
7	DSEC	BAGE 653	System Simulation and Agro-advisory Practical	-	-	2	1	50	50	100
8	DSEC	BAGE 654	Agricultural Journalism Practical	-	-	2	1	50	50	100

*Non-gradial course. This course is taught by Centre for Teaching Learning and Development (CTLD) to enhance soft skills in students. In the 50 marks internal 10 marks for attendance+40 marks for continuous evaluation process

**The student has to take the theory and practical of the same course

***Open elective course (OEC) is a MOOC course of eight week (minimum). This course is mandatory to qualify for the award of degree. The students have to submit the certificate of the MOOC to the University.

COURSE OUTLINE AND SYLLABUS OF B.Sc. (Hons.) AGRICULTURE
SEMESTER- VII
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Student READY (Rural and Entrepreneurship Awareness Development Yojana)

Course: Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE & AIA)-BAG-754

Sr. No.	Activities	No. of weeks	Credit Hours
1	General orientation & On campus training by different faculties	1	14
2	Village attachment	8	
3	Unit attachment in Univ./ College. KVK/ Research Station Attachment	5	
4	Plant clinic	2	02
5	Agro-Industrial Attachment	3	04
6	Project Report Preparation, Presentation and Evaluation	1	
Total weeks for RAWE & AIA		20	20
Total Marks = 100			

- **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

Sr. 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	
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, Post-harvest-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

Evaluation

Internal Evaluation (100 marks)

The above mentioned RAWE programme conducted under the supervision of concerned faculty members and would be evaluated by the 3 internal faculty members on a 8 point scale as mentioned below.

Plant Health Clinic	Field Visits	Unit attachment in Univ./ College. KVK/ Research Station Attachment	Agro-industrial Attachment	Village Attachment	Report/Presentation	Viva	Attendance	Total Internal
10 marks	10 marks	10 marks	10 marks	30 marks	10 marks	10 marks	10 marks	100 marks

Educational tour

Educational tour will be conducted in break between IV & V Semester or VI & VII Semester. Student study and educational tours will be conducted for 1-2 weeks to well-known institutions and organizations and interactions with their faculty to help students broaden their knowledge and skills.

The course will be non-gradial and expenditure on tour will be borne by the students.

Sr. No.	Course Type	Course Code	Course Title	Credit	Marks (internal)
01.	VAC	BAG 755	Educational tour	2	100

The students have to prepare the tour report and present it before a committee of three faculty members including the coordinators. The evaluation of this course will be internal.

COURSE OUTLINE AND SYLLABUS OF B.Sc.(Hons.) AGRICULTURE
SEMESTER- VIII
TEERTHANKER MAHAVEER COLLEGE OF AGRICULTURE SCIENCES
Teerthanker Mahaveer University

Student READY (Rural and Entrepreneurship Awareness Development Yojana)

Course: Experiential Learning Programme (ELP)

Sr. No.	Course Type	Course Code	Course Title	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1.	ELP	BAG-852	Production Technology for Bioagents and Biofertilizer	-	-	20	10	50	50	100
2.	ELP	BAG-853	Seed Production and Technology	-	-	20	10	50	50	100
3.	ELP	BAG-854	Mushroom Cultivation Technology	-	-	20	10	50	50	100
4.	ELP	BAG-855	Soil, Plant, Water and Seed Testing	-	-	20	10	50	50	100
5.	ELP	BAG-856	Commercial Beekeeping	-	-	20	10	50	50	100
6	ELP	BAG-857	Poultry Production Technology	-	-	20	10	50	50	100
7	ELP	BAG-858	Commercial Horticulture	-	-	20	10	50	50	100
8	ELP	BAG-859	Floriculture and Landscaping	-	-	20	10	50	50	100
9	ELP	BAG-860	Food Processing	-	-	20	10	50	50	100
10	ELP	BAG-861	Agriculture Waste Management	-	-	20	10	50	50	100
11	ELP	BAG-862	Organic Production Technology	-	-	20	10	50	50	100
12	ELP	BAG-863	Commercial Sericulture	-	-	20	10	50	50	100
			Total	-	-	40	20			200

Following courses of ELP are offered by College of Agriculture Sciences, Teerthanker Mahaveer University
1-Production technology for bioagents and biofertilizer
2-Mashroom cultivation technology
3- Commercial Horticulture
4- Food Processing
A student has to register 20 credits opting for two modules of 10 credits each (total 20 credits) from the package of modules in the VIII semester

newly added Course.

Mushroom Cultivation Technology

Course Type	Course Code	L T P C
Experience Learning Programme	BAG 854	0 0 10 10

The Course Outcomes (COs).
On completion of the course the students will be

CO-1	Understanding the principles and methods of mushroom cultivation
CO-2	Demonstrating the production technology of oyster and button mushroom
CO-3	Developing entrepreneurship in mushroom cultivation

- Introduction and Identification of edible and poisonous mushroom.
  History, Importance, Scope, General morphology of edible mushroom, Nutritive value (protein, vitamins, minerals, carbohydrates and fats), medicinal importance and present status of the edible mushroom. Classification of mushrooms, Poisnous mushrooms
- Preparation of Cultural media (PDA, Oat meal agar, Wheat meal agar and Yeast Potato dextrose agar) Preparation of different media required to obtain the pure culture of the fungus (mushroom).
- Culturing of the mushroom can be done with spore print and tissue culture methods. It includes obtaining pure culture, sub culturing, slant preparation for maintaining the culture.
  - ✓ Preparation of mother culture by spore print.
  - ✓ Preparation of mother culture by tissue culture method.
- Preparation of master culture and Spawn: *Agaricus, Pleurotus*
  Preparation of mother spawn by mixing the pure mushroom culturewith grain based medium.
- Preparation of Substrate for cultivation: Composted substrate
- Spawning (Mixing of spawn to the compost)
- Preparation of Casing soil.
- Casing of the beds.
- After care of beds, harvesting and packing and marketing
  Harvesting and weighing of mushrooms. Packaging with polythene and marketing by organizing stalls, exhibition, or visinting markets.

Reference Books:

- Singh R.P. and Chaube H.S. (1995) Mushroom Production Technologies. GBPUAT, Pantnagar.104p
- Upadhyay R.C., Singh S.K. and Rai R.D. (2003) Current Vistas in Mushroom Biology and production. MSI. Solan. 289p
- Chang S.T. and Miles P.G. (2004) Mushroom cultivation, nutritional value, medicinal effect and environmental inpact. CRC Press London.451p.

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Newly Added Course

Commercial Horticulture

Course Type	Course Code	L T P C
Experience Learning Programme	BAG- 858	0 0 10 10

The Course Outcomes (COs).
On completion of the course the students will be

CO-1	Understanding the importance of commercial horticulture and protected cultivation
CO-2	Applying the propagation and various sowing methods
CO-3	Applying and analyzing the food safety methods

- To study the different propagation methods, garden tools, morphological characters, layout, planting, different types of gardens and green house.
- Quality parameters and post-harvest practices of various horticulture crops.
- Food safety standard, FSMS, HACCP and various other methods of food safety at food related industry.
- Introduction and identification of bacteria in different food sample, quality analysis and detection of food borne pathogens.
- Nursery management, potting mixture, identification, different sowing methods, intercultural operations of horticultural crops.
- Visual analysis of commercial nurseries/orchard, gardens, processing industries and hi-tech nursery/orchard.
- Food processing industry to experience hand on training.

Reference Books:

1. Commercial Horticulture by N.L. Patel, S.L Chawala and T.R. Ahlawat. New India Publishing Agency New Delhi.
2. Commercial Production of Horticultural Crops by H.N. Samaddar. Naya Udyog. Kolkata.

Registrar

newly added courses

Food Processing

Course Type	Course Code	L T P C
Experience Learning Programme	BAG-860	0 0 10 10

The Course Outcomes (COs)

On completion of the course the students will be

CO-1	Understanding the concepts, principles and techniques of food processing
CO-2	Explaining the concept of successful entrepreneur in the field of food processing.
CO-3	Applying principles and various food processing technique to develop product from a variety of food crops and utilization of waste food byproduct to prepare value added product

- Understanding of course and the basic concepts of food and food processing
- Methods of Food Processing and evaluation--Drying, Baking, Freezing, Fermentation, Pasteurization, Germination, Irradiation, Sensory Evaluation, keeping quality, preservation and Storage
- Processing and product development from Fruit Crop –Jam, Jellies, Squash, RTS, etc
- Processing and product development from vegetable Crop – Drying, Pickling, RTS beverages etc.
- Processing and product development from medicinal Crop –Candy, Jam, Dry Powder, RTS, Squash
- Processing and product development from Spices Crops –Drying, grading etc
- Fermentation, Germination, Malting, Baking of food products
- Processing of Milk and Milk Product- Fermented and non fermented product development
- Product Development by Utilizing Food Waste
- Industrial visit and expert lecture to enhance and promote the entrepreneurial skill

Reference Books:

1.Sivasankar, B. (2002). Food Processing and Preservation. Prentice Hall India Learning Private Limited. 372p

2.Subbhalakshmi, G and Udipi, S. A. (2005) Food Processing and Preservation New Age International Pvt Ltd Publishers

3. Sinha S. (2012) Principles of Food Processing. Adhyayan Publishers & Distributors. 272p

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newly added Course

Introduction to Forestry

Course Type	Course Code	L	T	P	C
Core Course	BAG 108	1	0	0	1

The Course Outcomes (COs).
On completion of the course the students will be

CO – 1	Understanding the basic concepts and principles of forestry and agro-forestry systems.
CO – 2	Applying various methods, designs and techniques for the establishment of agro-forestry systems in different agro-climatic conditions.
CO – 3	Analyzing various procedures, methods and theories adopted for identifying, measuring and establishing the different agro-forestry systems.
CO – 4	Evaluating the different methodologies and techniques adopted for the development of agro-forestry systems for ensuring food security.

Unit1 **(4Hours)**

Agroforestry – definition, objectives and potential. Distinction between agroforestry and social forestry. Status of Indian forests and role in India farming systems.

Unit 2 **(4Hours)**

Agroforestry system, sub-system and practice: Agri-silviculture, silvipastoral, horti-silviculture, horti-silvipastoral

Unit 3 **(4Hours)**

Shifting cultivation, taungya, home gardens, alley cropping, intercropping, wind breaks, shelterbelts and energy plantations. Planning for agroforestry – constraints, diagnosis and design methodology

Unit 4 **(4Hours)**

Selection of tree crop species for agro-forestry. Agroforestry projects – national, overseas, MPTS – their management practices

Unit 5 **(4Hours)**

Economics of cultivation – nursery and planting (*Acacia catechu*, *Dalbergiasissoo*, Tectona, Populus, Morus, Grewia, Eucalyptus, Quercus spp. and bamboo, tamarind, neem etc.).

Text Books:

1. Indian wood technology, Brown, H., IBD Publishers, Dehra Dun.

newly added course

Introduction to Forestry Practical

Course Type	Course Code	L	T	P	C
Core Course	BAG 155	0	0	2	1

The Course outcomes (COs)

On completion of the course, the students will be

CO-1	Applying various designs and layouts of agro-forestry systems for maximizing the production and income in agriculture.
CO-2	Applying the genetic and agronomic principles for growing various multipurpose tree species to achieve maximum economic yield per year

LIST OF PRATICALS

1. Identification and seeds and seedlings of multipurpose treespecies.
2. Nursery practices for poplar, Grewiaoptiva, Morusalba,
3. Nursery practices for Acacia catechu, *Dalbergia sissoo*, robinia, leucaena etc.
4. Visit to agro-forestry fields to study the compatibility of MPTS with agricultural crops: silvipastoral,
5. Alley cropping, horti-silviculture, agro-silvipasture, fuel and fodder blocks.
6. Visit to social forestry plantations – railway line plantations, canal plantations,
7. Visit to roadside plantations,
8. Visit to industrial plantations and shelter belts.
9. Rapid assessment of farmers needs for green manure, fodder, fuel wood in selected villages.
10. Economics and marketing of products raised in agro-forestry systems.

Evaluation of Practical Examination:

Internal Evaluation **(50marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 3-point scale which would include the practical conducted by the students and a viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practicalfile.

Practical Performance during the semester 35 marks				On the day of exam 15 marks		
Experiment	File work	Viva	Attendance	Experiment	Viva	Total internal marks 50
05 marks	10 marks	10 marks	10 marks	5 marks	10 marks	

newly added course

Human Values and Ethics

Course Type	Course Code	L	T	P	C
Ability Enhanced Course	BAG 419	1	0	0	1

The Course Outcomes (COs)
On completion of the course the students will be

CO-1	Understanding the significance of value inputs, distinguish between values and skills, the need, content and process of value education,
CO-2	Understanding the meaning of Harmony in the Self the Co-existence of Self and Body, the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
CO-3	Exploring the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society
CO-4	Applying the harmonious relationship in nature and existence, and work out their mutually fulfilling participation in the nature.

Unit-I **(4Hours)**

Values and Ethics-An Introduction. Goal and Mission of Life. Vision of Life. Principles and Philosophy.

Unit-II **(4Hours)**

Understanding harmony in the Self- Self-Exploration. Self Awareness. Self Satisfaction, Positive Spirit. Body, Mind and Soul.

Unit-III **(4Hours)**

Understanding harmony in the Family and the society, Motivation. Sensitivity. Success. Selfless Service.

Unit-1V **(4Hours)**

Understanding the harmony in the Nature, Case Study of Ethical Lives.

Unit-V **(4Hours)**

Attachment and Detachment, Decision Making.

Text Book :

1.Gaur RR, Sangal R & Bagaria GP. 2011. A Foundation Course in Human Values and Professional Ethics, Ethics. Excel Books.

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newly added course

Agricultural Finance and Cooperation

Course Type	Course Code	L T P C
Core Course	BAG 310	2 0 0 2

The Course outcomes (Cos).
On completion of the course the students will be

CO-1	Understanding the importance of credit and role of financial institution in Indian Agriculture.
CO-2	Describing the computer operating system and ICT tools and their application in Agriculture
CO-3	Analyzing the agricultural credit and financial statements for the farmers and agri entrepreneur

Unit 1 **(4 Hours)**

Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits.

Unit 2 **(4 Hours)**

Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks, Micro financing including KCC. Lead bank scheme, RRBs, Scale of finance and unit cost.

Unit 3 **(4 Hours)**

An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank, Insurance and Credit Guarantee Corporation of India. Cost of credit. Recent development in agricultural credit. Preparation and analysis of financial statements – Balance Sheet and Income Statement. Basic guidelines for preparation of project reports- Bank norms – SWOT analysis.

Unit 4 **(4 Hours)**

Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of coóperation, significance of cooperatives in Indian agriculture.

Unit 5 **(4 Hours)**

Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED.

Text Books:

1.Agricultural Cooperation, Martin Abraham Abrahamsen, Claude L. Scroggs U of Minnesota Press.

Reference Books:

1. Cooperation Principles, Problems And Practice,T.N. Hajela Ane Books Pvt Ltd.
2. Agricultural Prices and Commodity Market Analysis. John N. FerrisMcGraw-Hill Inc.,US
3. Agricultural Economics. Subba Reddy.Oxford

Registrar

newly added course

Agricultural Finance and Co-Operation Practical

Course Type	Course Code	L T P C
Core course	BAG 360	0 0 2 1

The Course Outcomes (COs):
On completion of the course the students will be

CO – 1	Analysing the utilization, allocation of capital and performance of financial institution.
CO – 2	Estimating the credit requirement and appraisal of loan and preparation of financial and farm business project report.
CO – 3	Applying the statistical and ICT tools for data analysis.

List of Practicals:

1. Determination of most profitable level of capital use. Optimum allocation of limited amount of capital among different enterprise.
2. Analysis of progress and performance of cooperatives using published data. Analysis of progress and performance of commercial banks and RRBs using published data.
3. Visit to a commercial bank, cooperative bank and cooperative society to acquire firsthand knowledge of their management,
4. 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.
5. 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. Seminar on selected topics.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 3 point scale which would include the practical conducted by the students and a viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Practical Performance during the semester 35 marks				On the day of exam 15 marks		
Experiment	File work	Viva	Attendance	Experiment	Viva	Total internal marks 50
05 marks	10 marks	10 marks	10 marks	5 marks	10 marks	

External Evaluation (50 marks)
The external evaluation would also be done by the external examiner based on the experiment conducted during the examination.

Experiment	File Works	Viva	Total External
30 marks	10 marks	10 marks	50 marks

Registrar

newly added course

Agri-Informatics

Course Type	Course Code	L T P C
Core Course	BAG 316	1 0 0 1

Unit 1 **(4 Hours)**

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

Unit 2 **(4 Hours)**

World Wide Web (WWW): Concepts and components. Introduction to computerprogramming languages, concepts and standard input/output operations.e-Agriculture, concepts and applications, Use of ICT in Agriculture.

Unit 3 **(4 Hours)**

Computer Models forunderstanding plant processes. IT application for computation of water and nutrient requirementof crops, Computer-controlled devices (automated systems) for Agri-input management,Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc.

Unit 4 **(4 Hours)**

Geospatial technology for generating valuable agri-information. Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions

Unit 5 **(4 Hours)**

Preparation of contingent crop-planningusing IT tools.

Text Books:

1. Agri Informatics: An Introduction (Industry Series), by R Chakravarthy, ICFAI UNIVERSITY PRESS

Reference Books:

1. Agro-Informatics, G. vanitha, New Delhi Publishing Agency
2. Leon & Leon, Fundamental of Information Technology, Vikas Publishing
3. Lehngart, Internet 101, Addison Wesley

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newly added course

Agri-Informatics Practical

Course Type	Course Code	L T P C
Core course	BAG 367	0 0 2 1

Practical

1. Study of Computer Components, accessories, practice of important DOS Commands.
2. Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files &Folders, File Management.
3. Use of MS-WORD and MS Power-point for creating, editing andpresenting a scientific Document.
4. 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.
5. Introduction to World Wide Web (WWW). Introduction of programming languages. Hands on Crop SimulationModels (CSM) such as DSSAT/Crop-Info/CropSyst/ Wofost
6. Computation of water and nutrientrequirements of crop using CSM and IT tools.
7. Introduction of Geospatial Technology for generating valuable information for Agriculture. Hands on Decision Support System. Preparationof contingent crop planning.

Evaluation of Practical Examination:

Internal Evaluation **(50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 3 point scale which would include the practical conducted by the students and a viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Practical Performance during the semester 35 marks				On the day of exam 15 marks		
Experiment	File work	Viva	Attendance	Experiment	Viva	Total internal marks 50
05 marks	10 marks	10 marks	10 marks	5 marks	10 marks	

External Evaluation **(50 marks)**

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination.

Experiment	File Works	Viva	Total External
30 marks	10 marks	10 marks	50 marks

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newly added course

Production Technology for Ornamental Crops, MAPs and Landscaping

Course Type	Course Code	L T P C
Core course	BAG- 411	1 0 0 1

Course Outcomes (COs).

On completion of the course the students will be

CO-1	Understanding the scope and importance of ornamental crops and their use in landscaping
CO-2	Analyzing various production technologies of important medicinal, aromatic and ornamental crops.
CO-3	Evaluating different packages of practices for loose flowers

Unit 1 **(4 Hours)**

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers.

Unit 2 **(4 Hours)**

Production technology of important cut flowers like rose, gerbera, carnation, lilium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions.

Unit 3 **(4 Hours)**

Package of practices for loose flowers like marigold and jasmine under open conditions.

Unit 4 **(4 Hours)**

Production technology of importantmedicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgoland aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver.

Unit 5 **(4 Hours)**

Processing and value addition in ornamental crops and MAPs produce.

Text Books:

1. Terminology of Horticulture by Neeraj Pratap Singh.International Book Distributing Co (IBDC Publishers)

Reference Books:

4. Postharvest Management and Value Addition Ashwai K.Goel, Rajinder Kumar, Satwinder S. MannDaya Books.
5. Handbook of Agriculture. ICAR.
6. Basics of Horticulture by K.V. Peter. New India Publishing Agency, New Delhi
7. Principles of Horticulture by C.R. Adams, M.P. Early. Routledge
8. Basic Concepts of Vegetable Science Singh N. P.International Book Distributing Company,

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newly added Course

Production Technology for Ornamental Crops, MAPs and Landscaping Practical

Course Type	Course Code	L T P C
Core course	BAG 456	0 0 2 1

The Course outcomes (COs).
On completion of the course the students will be

CO-1	Understanding the propagation, scarification and stratification of seeds.
Co-2	Applying the preparation of plant bio-regulators and their uses.
CO-3	Analyzing the propagation methods for fruit and plantation crops.

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.

Evaluation of Practical Examination:

Internal Evaluation **(50 marks)**

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 3 point scale which would include the practical conducted by the students and a viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Practical Performance during the semester 35 marks				On the day of exam 15 marks		
Experiment	File work	Viva	Attendance	Experiment	Viva	Total internal marks 50
05 marks	10 marks	10 marks	10 marks	5 marks	10 marks	

External Evaluation **(50 marks)**

The external evaluation would also be done by the external examiner based on the experiment conducted during the examination.

Experiment	File Works	Viva	Total External
30 marks	10 marks	10 marks	50 marks

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newly added course

Production Technology for Bioagent and Biofertilizer

Course Type	Course Code	L T P C
Experience Learning Programme	BAG 852	0 0 10 10

The Course Outcomes (COs).

On completion of the course the students will be

CO-1	Understanding the basic principles and techniques of applied agricultural microbiology
CO-2	Analyzing the effect of various microbial formulations on crop productivity and ecological benefits
CO-3	Developing novel microbial formulations and demonstrating their potential at farmers' fields
CO-4	Evaluating the potential of microbes in laboratory, green house and field
CO-5	Evaluating the different methods of microbial formulations, storage and application in fields

Syllabus

- Project planning and writing, market- industry- and field survey, business-networking skills
- Familiarization with lab etiquettes and safety, maintenance of lab equipment and space
- Preparation of different media, reagents and buffers. Maintenance of aseptic practices and sterilization techniques
- Isolation, maintenance, characterization, sub-culturing, preservation and mass multiplication of agriculturally important bacteria, fungi, pathogens, and biocontrol agents from diverse sources
- Evaluation of plant growth promoting and biocontrol potential of microbes in laboratory, green house and fields
- Formulations of microbial agents for storage, transportation and application (seed coating, drenching, spraying etc.)
- Developing, employing and evaluating different business models
- Writing report and presentation of observations and findings

Reference Books:

Aneja KR (2017). Experiments in Microbiology, Plant Pathology and Biotechnology. New Age International Publishers; Fifth edition

Kannaiyan S (2002). Biotechnology of Biofertilizers. Springer Science & Business Media

Board N (2012). The Complete Technology Book On Bio-Fertilizer And Organic Farming. NIIR Project Consultancy Services.

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newly added course

Production Technology for Fruit and Plantation Crops

Course Type	Course Code	L T P C
Core Course	BAG 417	1 0 0 1

The Course Outcomes (COs).

On completion of the course the students will be

CO-1	Understanding the scope and importance of fruit and plantation crops industries in India
CO-2	Demonstrating the effective production technologies for the cultivation of important fruit and plantation crops
CO-3	Analyzing various production technologies for the cultivation of fruit and plantation crops

Unit 1 **(4 Hours)**

Importance and scope of fruit and plantation crop industry in India; Importance of rootstocks

Unit 2 **(4 Hours)**

Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava

Unit 3 **(4 Hours)**

Production technologies for the cultivation of major fruits-litchi, papaya, sapota, apple, pear, peach, walnut, almond

Unit 4 **(4 Hours)**

Production technologies for the cultivation of minor fruits- date, ber, pineapple, pomegranate, jackfruit, strawberry

Unit 5 **(4 Hours)**

Production technologies for the cultivation of plantation crops-coconut, arecanut, cashew, tea, coffee &rubber

Text Books:

1. Production Technology of Plantation Crops, Spices, Aromatic and Medicinal Plants. L.K. Dashora, S.S. Lakhawat, Abhay Dashora. Agrotech Publishing Academy.

Reference Books:

1. Handbook of Agriculture. ICAR.
2. Production Technology Of Plantation Crops, Spices, Aromatic And Medicinal Plants, L K Dashora, Abhay Dashora, S S Lakhawat, Agrotech Publishing Academy
3. Basics of Horticulture by K.V. Peter. New India Publishing Agency, New Delhi
4. Principles of Horticulture by C.R. Adams, M.P. Early. Routledge
5. Basic Concepts of Vegetable Science Singh N. P. International Book Distributing Company,

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newly added course

Production Technology for Fruit and Plantation Crops Practical

Course Type	Course Code	L T P C
Core course	BAG 461	0 0 2 1

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.

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Post revision

Fundamentals of Plant Biochemistry and Biotechnology

Course Type	Course Code	L	T	P	C
Core Course	BAG 109	2	0	0	2

The Course Outcomes (COs).
On completion of the course the students will be

CO – 1	Understanding the structure, functions and chemical nature of living systems
CO – 2	Understanding the application of the modern approaches of biotechnology in micro-propagation and crop improvement
CO – 3	Analyzing the qualitative and quantitative properties of various biomolecules.

Unit-1 **(4Hours)**

Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharide, Reducing and oxidizing properties of Monosaccharide, Mutarotation; Structure of Disaccharides and Polysaccharides. Lipid: Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids.

Unit2 **(4Hours)**

Proteins: Importance of proteins and classification; Structures and zwitterions nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action; Introduction to allosteric enzymes.

Unit3 **(4 Hours)**

Nucleic acids: Importance and classification.Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Mechanism of DNA replication.

Unit4 **(4 Hours)**

Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, another 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 cybrids.

Unit5 **(4 Hours)**

Somaclonal 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.

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Pre-Revision

Principles of Plant Biotechnology

Course Code: BAG 403

L	T	P	C
2	0	0	2

Objective- Plant Biotechnology is one among the branches of agricultural science, which play an important role in transgenic.

UNIT-1 **(8 Hours)**

Concepts of Plant Biotechnology: History of Plant Tissue Culture and Plant Genetic Engineering; Scope and importance in Crop Improvement:

UNIT-2 **(8 Hours)**

Totipotency and Morphogenesis, Nutritional requirements of in-vitro cultures; Techniques of In-vitro cultures, Micro propagation, Anther culture, Pollen culture, Ovule culture, Embryo culture,

UNIT-3 **(8 Hours)**

Test tube fertilization, Endosperm culture, Factors affecting above in-vitro culture; Applications and Achievements; Somaclonal variation, Types, Reasons: Somatic embryogenesis and synthetic seed production technology;

UNIT-4 **(8 Hours)**

Protoplast isolation, Culture, Manipulation and Fusion; Products of somatic hybrids and cybrids, Applications in crop improvement. Genetic engineering; Restriction enzymes; Vectors for gene transfer – Gene cloning – Direct and indirect method of gene transfer.

UNIT-5 **(8 Hours)**

Transgenic plants and their applications. Blotting techniques – DNA finger printing – DNA based markers – RFLP, AFLP, RAPD, SSR and DNA Probes – Mapping QTL – Future prospects. MAS, and its application in crop improvement.

Text Books:

1. Introduction to Plant Biotechnology, Chawla, Oxford and IBH Publishing

2. Plant Biotechnology, Ashok Kumar, Discovery Publishing House

3. Plant Biotechnology and Tissue Culture Atul Kumar, Vandana A. Kumar International Book Distributing Company

4. Bojwani, S.S. and Razdan, M.K. 1983. Plant Tissue Culture: Theory and Practices, Elsevier, Amsterdam.

Reference Books:

1. Plant Biotechnology and Agriculture A. Altman, Paul M. Hasegawa Academic Press,

2. Plant Biotechnology: Practical Manual, C. C. Giri, Archana Giri

3. Klug. W.S. and Cummings, M.R. 1983. Concepts of Genetics. Charles E. Merill Publishing Co., London

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