Sant Gadge Baba Amravati University

Amravati

Scheme of Teaching, Learning & Examination

Leading to the Degree in Bachelor of Science in the Programme

Seed Technology

In the Faculty of Science and Technology

(Three years - Six Semester Degree Programme - C.B.C.S.)

B.Sc. Part III

Semester V and Semester VI

Session 2024 – 2025 Onwards

Sant Gadge Baba Amravati University, Amravati
Examinations leading to the Degree of Bachelor of Science
Three Years (Six Semesters) Degree Programme under Choice Based Credit System (CBCS)
Scheme of Teaching, Learning, Examination and Evaluation (B.Sc. - Seed Technology) (Semester-V)

Sr. No	Subject	Subject Code	Teaching & Learning Scheme							Duration of Exams	Examination & Evaluation Scheme						
			Teaching Period Per week				Credits			Hrs.	Maximum Marks					Minimum Passing	
			L	T	P	Total	Theory/ Tutorial	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancement Module (SEM) Int.	Practical		Total Marks	Marks	Grade
													Internal	External			
1	DSC V: Seed Pathology and Seed Entomology	Seed 5S	6	-	-	6	4.5	-	4.5	3	80	20	-	-	100	40	P
2	Lab	Seed 5S PR	-	-	6	6	-	2.25	2.25	3	-	-	25	25	50	25	P
3	Mini-Project/Hands-on Training/Workshop/DIY related to Seed Technology			-	6	6	--	2.25	2.25	2	Internal Assessment by college/institute/department				50	25	P
4	Internship/Apprenticeship/Field Work/Work Experience						150 Hours cumulatively from Sem II to Sem V resulting into earning of 5 Credits (Minimum 120 Hours mandatory resulting into earning of 4 Credits)										

L: Lecture, T: Tutorial, P: Practical, DIY: Do It Yourself activity

Notes :

1. Internship/Apprenticeship/Field Work/Work Experience is Mandatory. It can be carried out cumulatively from Semester I to Semester V for a duration of 150 Hours resulting into earning of 5 Credits (Minimum 120 Hours resulting into earning of 4 Credits is mandatory for every student). Internship /Apprenticeship/Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 120 hrs, cumulatively entailing 4 Credits. It's credits and grades will be reflected in final semester VI credit grade report.
2. Teaching period in the various subjects in the faculty of science shall be as prescribed by the executive council dated 1/2-4-1977, 11-7-1977 Appendix- P
3. If DSC (excluding Mathematics) is Physics, then 2 Tutorial be added.
4. There shall be Skill Enhancement Module (SEM) in each course of DSC and DSE
5. OEC (Optional) can be studied during semester I to V, Its credits and grades will be reflected in final semester VI credit grade report. OEC may be opted from Sem I to Sem V. It is comprised of GIC, Skill Course and MOOC (through SWAYAM)
6. Minimum 10% of the total credits of the UG (Bachelor's Degree) programme, that is, at least 12 credits are mandatory to be earned by all the students from Ancillary Credit Courses as mentioned in Table A (SGBAU, Direction No. 76/2022 ,Date 06/10/2022)
7. Extra-curricular and co-curricular activities: Maximum 5 Credits may be earned through Extra-curricular and co-curricular activities, which will be an option to OEC (maximum 75 hours and 5 credits), so that students performing in such activities shall be given exemption from undertaking

Sant Gadge Baba Amravati University, Amravati
Faculty: Science and Technology Programme: B.Sc. (Seed Technology)
Syllabus Prescribed for Three Year UG Programme: B.Sc. Semester- V

Code of the Course/Subject	Title of the Course/Subject	(Number of Periods per week)
Seed(5S) /Seed Technology	Seed Pathology and Seed Entomology	6

Course Outcomes:

After completion of this course successfully , the students would be able to
1. Demonstrate on understanding of seed borne diseases and their infection.
2. Identify and classify Insects pest and nature of infection.
3. develop critical thinking on honey bee, their social life and role in pollination
4. acquire skill of equipment's for Insect pest management.

Curriculum

For the Semester V Seed Technology subject will be taught through DSC-V and Skill Enhancement Module. DSC-V is the course which is to be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

Whereas, **Any One of the Skills Enhancement Modules (SEM) prescribed** shall have 20% weightage in the total curriculum of the subject. These skill modules shall be based on Learning Outcome of the course and shall be used for continuous evaluation of the students. These modules will be internally assessed flexibly on the basis of Class tests, assignments, seminar, reading material, project, survey, group discussion, Study tour, MCQ, Open Book exam (OBE), etc. Marks shall be sent in the format prescribed by the University from time to time.

	Unit	Content
Unit I	1.1. Seed pathology : Definition, History and Concept. 1.2. Economic significance of seed borne diseases. 1.3. Seed-borne fungi ,bacteria, viruses and nematodes. 1.4. Storage fungi and its impact on animal and human health 1.5. Entry point of seed infection	12
Unit II	2.1. Influence of environmental factors on seed borne diseases 2.2.Seed crop management 2.3. Seed treatment, procedures and Equipments 2.4. Quarantines of seed health testings 2.5. Procedures of sampling for seed health testing.	12
Unit III	3.1. Seed health testing: Concept and Methods 3.2. Inspection of plants beyond the seedling stage. 3.3. Seed certification and Tolerance limits of seed borne pathogens 3.4. Seed act in relation to Seed borne diseases 3.5. National and international Agencies and Institutes in seed pathology and their work	12
Unit IV	4.1. Insect: Introduction, Methods of insect classification, Orders of insects of economic importance. 4.2. Insect: body & appendages, Life-cycle of insect 4.3. Economic entomology Important insect-pests of seed crops, their nature of damage and management (i) Cereal- Paddy, Maize and Sorghum (ii) Pulses-Kharif pulses-Pigeonpeas, Mung, Rabbi-pulses-chickpea. (iii) Oil seeds-Mustard, Castor, Groundnut (iv) Vegetables	12
Unit V	5.1. Beneficial Insects: Concept, Types and their role in seed production. 5.2. Insect Pollinators: Concept, types and their uses in seed	12

	production. 5.3. Honey bees: Social structure, and bee keeping. 5.4. Insect control: Definition, methods of insect control Cultural, Mechanical, physical, quarantine Chemical control/pre harvest. 5.5. Sanitations spray Insecticide formulation and preparation of Spray solution.	
Unit VI	6.1. Entomology for seed: Concept , IPM strategies for important Insect pests. 6.2. Insect pests and mites in storage - Nature of damage and losses caused and factors influencing them. 6.3. Sources, development and detection of infestation. 6.4. Fumigants and methods of fumigation Seed protectants and their impact on seed viability.	12

SEM (SKILL ENHANCEMENT MODULE) SEMESTER V

Any One of the Following (Teaching Hours: 12 and Practical Sessions:03; ; Marks: 20)

	1. Honey bee: Concept, identification, classification, social identity, crop plants pollination by honey bees, their role, etc. OR 2: Plant Protection Equipment: Type of equipment's & their principles. Safe handling, maintenance and use of machines Rodents and their control in field and Seed Godowns.	
	COs:- On completion of this course the students will able to 1. Understand the plant protection instruments and honey bees 2. Develop the skill for roll of insect in pollination process. 3. Acquire the skill of morphological and microscopic examination of insect pest and seed borne pathogens.	
	**** Activities** 1. Photographic collection and preparation of e-herbarium of honey bees and different insect's pest. 2. Project on local crop plants to be submitted at the end of session.	

Course Material/Learning Resources

1. Seed Pathology Vol-I & II P. Naeergaard
2. Principles of Seed Pathology Vol-I & II V.K. Agarwal & J.B.Sinclair
3. Seed Treatment K.L. Jeffs.
4. Seed Technology - R.L. Agrawal
5. Introductory Mycology C.J.Alexopoulos
6. An introduction to fungi J.P. Srivastava
7. Systemic Fungicides R.W. Marsh
8. Fungicides in plant diseases control Y.L.Nene and P.N.Thapliyal
9. Destructive and useful insects by Metcalf and Flint
10. Insect Pollination of field crops by J.B.Free
11. Agricultural Entomology by A.S. Atwal

Sant Gadge Baba Amravati University, Amravati Syllabus
Prescribed for Three Year UG/PG Programme
B.Sc. Semester V

Practical Semester – V:

Code of the Course/Subject	**Title of the Course/Subject** (Laboratory/Practical/practicum/hands- on/Activity)	**(No. of Periods/Week)**
Seed(5S)/Seed Technology	**Seed Pathology and Seed Entomology**	**02**

COs

By the end of the Lab/Practical Course, generally students would be able to:
1) Understand various Instruments used in seed pathology.
2) Acquire the skill of preparation of slides of plant body and reproductive organs.
3) Classify and identify seed borne pathogens.
4) develop critical understanding on morphology and classification of insect pest and honey bees.

***List of Practical /Laboratory Experiments/Activities etc.**

S.N.	**Experiments**
1.	Demonstration and handling of stereobinocular microscope.
2.	Symptoms of important seed borne pathogens.
3.	Visual examination of dry seeds for disease symptoms.
4.	Examination of suspensions obtained from washings of seeds.
5.	Viability test-space germination test and tetrazolium test.
6.	Detection of important seed-borne bacteria-various methods.
7.	Detection of important seed borne viruses various-methods.
8.	External morphology of insect, type of mouth parts, antenna and legs.
9.	Identification of important storage pests, stages of insects.
10.	Detection of seed borne insects and estimation of infestation
11.	Plant protection equipments, their safe handling and use.
12.	Handling of bees for pollination.
13.	Collection and submission of stored product pests visit to warehouses and godowns.
14.	Visit of nucleus, breeder seed plots and study of maintenance of verities.
15.	Visit of foundation and certified seed plots and study of the techniques of seed production.
Additional activities	1. Excursion (short/long) 2. Visit to any Field area to study the Seed diversity and seed growing area in agriculture field. The excursion is compulsory for all students and the report of excursion should be submitted at the time of practical examination
Submission	1. Photographic herbarium of seed growing plants. 2. Tour reports or field visit report

Practical Evaluation Semester V

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
PRACTICAL EXAMINATION (Seed Technology), SEMESTER V – (CBCS New)
Practical – V Seed Pathology and Seed Entomology
Duration – Continuous Evaluation **Marks-25**

Q.No.	Internal Practical Examination	Marks-25
1	Attendance (Entire Semester)	05
2	Performance and Participations in conduct of the practical for Entire Semester -	09
3	**Activity participation and Report:** Academic/Institute/Industrial/Field visit or any report activity related to the subject	03
4	Practical Record Book	05
5	Internal Viva-Voce	03

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
PRACTICAL EXAMINATION (SEED TECHNOLOGY), SEMESTER V – (CBCS New)
Practical V: Seed Pathology and Seed Entomology
Time – 4 Hours **Max Marks-25**

1. Diagnosis of Symptoms of seed-borne pathogens 05
2. To Calculate the viability of seed by tetrazolium test 05
3. Study of mouth parts, antena and legs of given insect 05
4. Spotting 05
5. Viva-voce 05

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
PRACTICAL EXAMINATION (SEED TECHNOLOGY), SEMESTER V – (CBCS New)
SKILL ENHANCEMENT MODULE

Duration – Continuous Evaluation **Max Marks-20**

Q.No.	Criteria of Assessment	Marks-20
1	Attendance for SEM Classes and Activities	5
2	MCQ Assessment	5
3	Activity Report	5
4	Internal Viva-Voce	5

Sant Gadge Baba Amravati University, Amravati

Scheme of Teaching, Learning & Examination leading to the Degree in Bachelor of Science in the Programme

Seed Technology in the Faculty of Science and Tech.

(Three years- Six Semester Degree Programme- C.B.C.S.) (B.Sc. Part III) Semester VI

Sr.	Subject	Subject code	Teaching & Learning Scheme							Duration of Exam Hours	Examination & Evaluation Scheme						
			Teaching Periods Per Week				Credits				Theory		Practical		Total Marks	Minimum Passing	
			L	T	P	Total	T/T	Practical	Total		Theory+ MCQ External	Skill Enhancement Module	Internal	External		Marks	Grade
1	**DSE - I:** Seed Processing, Farm Management and marketing	SEED 6S	6	-	-	6	4.5	-	4.5	03	80	20	-	-	100	40	P
2	Lab **DSE - I:** Seed Processing, Farm Management and marketing	SEED 6S PR	-	-	6	6	-	2.25	2.25	04	-	-	25	25	50	25	P
3	Mini-Project/Hands-on Training/ Workshop/DIY related Seed Technology				6	6	-	2.25	2.25	02	Internal Assessment by college/institute/department				50	25	P

L: Lecture, T: Tutorial, P: Practical, DIY: Do It Yourself activity

Notes:

1. **Internship/Apprenticeship/Field Work/Work Experience is Mandatory.** It can be carried out cumulatively from Semester I to Semester V for a duration of 150 Hours resulting into earning of 5 Credits **(Minimum 120 Hours resulting into earning of 4 Credits is mandatory for every student).** Internship /Apprenticeship/Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 120 Hrs, cumulatively entailing 4 Credits. It's credits and grades will be reflected in final semester VI credit grade report.
2. **Teaching period in the various subjects in the faculty of science shall be as prescribed by the executive council dated 1/2-4-1977, 11-7-1977 Appendix- P**
3. **If DSC (excluding Mathematics) is Physics, then 2 Tutorial be added.**
4. There shall be Skill Enhancement Module (SEM) in each course of DSC and DSE
5. **OEC (Optional) can be studied during semester I to V, Its credits and grades will be reflected in final semester VI credit grade report.** OEC may be opted from Sem I to Sem V. It is comprised of GIC, Skill Course and MOOC (through SWAYAM)
6. **DSE (DISCIPLINE/DEPARTMENT SPECIFIC ELECTIVE): A BASKET CONTAINING AT LEAST TWO COURSES/SUBJECTS SHALL BE PROVIDED, SO THAT STUDENT HAS A CHOICE FOR THE SELECTION.**

7. Minimum 10% of the total credits of the UG (Bachelor's Degree) programme, that is, at least 12 credits are mandatory to be earned by all the students from Ancillary Credit Courses as mentioned in Table A (SGBAU, Direction No. 76/2022, Date 06/10/2022)
8. **Extra-curricular and co-curricular activities**: Maximum 5 Credits may be earned through Extra-curricular and co-curricular activities, which will be an option to OEC (maximum 75 hours and 5 credits), so that students performing in such activities shall be given exemption from undertaking OEC.

Sant Gadge Baba Amravati University, Amravati

Syllabus Prescribed for Three-Year UG Programme

Programme: B.Sc. III

Semester VI (CBCS Scheme)

For the Semester VI Seed Technology subject will be taught through Elective Paper in DSE – I and Skill Enhancement Module. DSE are the courses from which one must be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

Whereas, **Any One of the Skills Enhancement Modules (SEM) prescribed** shall have 20% weightage in the total curriculum of the subject. These skill modules shall be based on Learning Outcome of the course and shall be used for continuous evaluation of the students. These modules will be internally assessed flexibly on the basis of Class tests, assignments, seminar, reading material, project, survey, group discussion, Study tour, MCQ, Open Book exam (OBE), etc. Marks shall be sent in the format prescribed by the University from time to time.

DSE I: Seed Processing, Farm Management and marketing

Code of the Course/Subject	Title of the Course/Subject	Total Number of Period
DSE I: Seed (6S)/Seed Technology	Seed Processing, Farm Management and marketing	72

Course Outcomes:

After completion of this course successfully, the students would be able to –

1. demonstrate on understanding of Archegoniate, Bryophytes, Pteridophytes and Gymnosperms.
2. identify and classify plants from Bryophytes, Pteridophytes and Gymnosperms.
3. develop critical thinking on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.
4. acquire skill of collection and preservation of Bryophytes, Pteridophytes and Gymnosperms

	Unit	Content
Unit I	1.1. Seed drying : Concept, specific gravity separators, 1.2. Importance and advantage of seed drainage. 1.2. Moisture content: methods of seed moisture measurement. 1.3. Adjustment of intentented disc and intented cylinder separators 1.4. Surface texture separation : The roll mill, parts of the machine, Separating action and the adjustments, cleaning roll mills. 1.5. Seed treatment : Seed treatment equipment, slurry treater, parts of the machine, construction and operation,	12
Unit II	2.1. Labeling of treated seeds and related precautions, storage of treated seeds, machine operation, and seed users safety. 2.2. Site selection for seed processing plant, Layout of machines in a seed processing plant for efficient production 2.3. Mechanical inquiry of seeds in post-harvest phase, maintenance and repair of seed processing equipment. 2.4. Seed conveyors and elevators, bucket elevators, belt conveyors, screen conveyors. 2.5. Computing the required height of bucket elevators capacity determination of bucket elevators.	12
Unit III	3.1. Packaging of seeds: bager weigher, bag closing, labelling and maintaining lot identity, lot numbers, seed pellets, handling and stacking. 3.2. Maintenance of seed processing records. 3.3. seed storage structures : construction, operation and maintenance, aeration air conditioning, dehumidification and stacking. 3.4. Moisture and heat proofing of seed storage structures,	12

	3.5. Seed storage management.	
Unit IV	4.1. Farm management: Concept, scope and basic principles. 4.2. Decision making based on production, cost and capital investment. 4.3. Cost analysis law of diminishing return, opportunity cost, most profitable combination of input and output 4.4. Planning and management of crops, Building and machinery Important crops of India. 4.5. Machinery selection and their management	12
Unit V	5.1. Concepts of various crop production operations viz tillage, irrigation, sowing plant protection, harvesting and threshing, maintenance of soil fertility, weeds and their control, mixed cropping, multiple cropping. 5.2. Determination of field capacity and field efficiency, machinery adjustments. 5.3. Consideration in farm buildings implement shed, storage structures. 5.4. Farm business analysis, Farm size, factors affecting profit and economic size of farm. 5.5 Seed markets in India, Structure and working.	12
Unit VI	6.1. Budget and Record Keeping 6.2 Farm budgeting, procedure and use, Farm efficiency measures, farm records and their use. 6.3 Management of Land Labour and Capital Farm Surveys, Data Collection analysis 6.4. Marketing Basic concepts, supply and demand price equilibrium, seed transportation and storage cost and returns, 6.5. Seed market surveys, Projections of supply and demand for different kinds of seed in India-Seed pricing of Breeder /Foundation /Certified Seeds.	12

Skill Enhancement Module (SEM)

	1. Seed Treatment Plant: Concept, procedure of seed storage units, design of godowns, instrumentation, roll in storing of seeds. OR 2. Farm Management: Concept, roll of farmers in farm management, skill and training, facilities needed, soil-water-environemnt, etc.	
	COs:- On completion of this course the students will able to 1. Understand the storage units in farm management. 2. Develop the skill for drying and storage facility of seeds. 3. Acquire the skill of marketing of seed crops.	
	**** Activities** 1. Photographic collection and preparation of different seed storing units 2. visit local villages for study of farm management practices 3. visit marketing firms 4. Project on farm management and marketing of seeds.	

Sant Gadge Baba Amravati University, Amravati
Syllabus Prescribed for Three Year UG
Programme: B.Sc. III Semester VI
Practical Semester VI – DSE I Seed Processing, Farm Management and marketing

Code of the Course/Subject	**Title of the Course/Subject**	**(No.of Periods/week)**
SEED (6S)/SEED TECHNOLOGY	Seed Processing, Farm Management and marketing	**(2 Practicals per week)**

Course Outcomes:

By the end of the Lab/Practical Course, generally students would be able to:

1) Understand different crop seeds and their shapes.
2) Acquire the skill of gravity seed separators, calibration and adjustment of various farm machines.
3) Classify and identify different plant parts on the basis of external morphology.
4) Describe Farm planning and Budgeting technical language.
5) develop critical understanding of farm budgeting

***List of Practical /Laboratory Experiments/Activities etc.**

S.N.	**Experiments**
1.	Study of physical characteristics of different crop seeds and their shapes
2.	Determination of physical properties of seeds of different crops
3.	Measurement of seed moisture content by direct and indirect methods of Dring.
4.	Study of specific gravity separator
5.	Study of seed treatment machines
6.	Study of bucket elevator, screw conveyors and pneumatic elevators.
7.	Identification of farm machines and their use
8.	Determination of field capacity and field efficiency
9.	Soil sampling fertility and moisture content
10.	Calibration and adjustment of various farm machines
11.	Cost analysis
12.	Farm planning and Budgeting
13.	Record Keeping
Additional activities	1. Excursion (short/long) 2. Visit to any marketing firm to study the Seed diversity and seed growing area in agriculture field. The excursion is compulsory for all students and the report of excursion should be submitted at the time of practical examination
Submission	1. Photographic seed management at field. 2. Tour reports or field visit report

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
PRACTICAL EXAMINATION (SEED TECHNOLOGY), SEMESTER VI – (CBCS New)
Practical – VI Seed Processing, Farm Management and marketing
Duration – Continuous Evaluation **Marks-25**
Internal Practical Examination

Internal Practical Examination

1. Identify and describe equipment A,B,C,D,E.	05
2. Submission of field Report.	05
3. Submission of seed specimen.	05
4. Record book.	05
5. & Viva –voce.	05

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
PRACTICAL EXAMINATION (Seed Technology), SEMESTER VI – (CBCS New)
Practical – VI Seed Processing, Farm Management and marketing

Time: 4 hrs. **Max. Marks: 25**

External Practical Examination

1. Determination of physical properties of seeds of different crops.	05
2. Identification of farm machine and their use.	05
3. Study of operations of seed treatment equipment.	05
4. Spotting	05
5. Viva –voce.	05

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
PRACTICAL EXAMINATION (SEED TECHNOLOGY), SEMESTER VI – (CBCS New)
SKILL ENHANCEMENT MODULE

Duration – Continuous Evaluation **Max Marks-20**

Q.No.	**Criteria of Assessment**	
1	Attendance for SEM Classes and Activities	5
2	MCQ Assessment	5
3	Activity Report	5
4	Internal Viva-Voce	5

Course Material/Learning Resources

Textbooks and Reference Books

1. Hand book of Agriculture, Indian Council of Agricultural Research,Krishi Bhavan, New Delhi
2. Farm Power and Machinery Management, Vth edition, 10WA State, U.S.A. Hunt, D,1968
3. Farm Management Decision, Operation Control.John E Kadlec, Prentice Hall, Inc Englwood, Chiffs, New jersey, U.S.A.
4. Fundamentals of farm Management S.S. Joshi and T.R. Kapur, Kalyani Publishers, India, Ludhiana. 5. Fundamentals of farm Management A.S.Kahlon and Karam Singh, Kalyani Awed Publishers PVT.Ltd. 13/14 Asaf Ali Road New delhi/ Madras/Bombay/Calcutta/Bangalore.
5. Economics of farm Production and Management, V.T. Raju and DVS Rao, IBH Publishing Co Pvt.Ltd.New Delhi.
6. Agricultural Marketing in India, S.S.Achary Oxford and I.B.H., New Delhi. 8. Seed Technology - R.L.Agrawal