Soil Science and Agronomy Field Lab		Semester	I/II
Course Code	**BSSAL107/207**	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	(0:0:2:0)	SEE Marks	50
Total Hours of Pedagogy	24 Hours (12-week session)	Total Marks	100
Credits	1	Exam Hours	2
Examination type (SEE)	**Practical**		

Course Outcomes

At the end of the course, the student will be able to:

1. Describe soil profile and collection of soil samples.
2. Determine pH and EC using standard methods.
3. Demonstrate the different implements for practicing ploughing, seed bed preparation, sowing, weeding and fertilizer application.
4. Identify different nutrient deficiency symptoms in the crops.
5. Measure infiltration and evaporation rate in soil using standard procedure.
6. Classify different crops, manures and fertilizers

Note:

1. The laboratory syllabus consists of PART-A and PART-B. While PART-A has 6 conventional experiments, PART-B has 6 typical open-ended experiments. The maximum marks for the laboratory course are 100.
2. Both PART-A and PART-B are considered for CIE and SEE.
3. Students have to answer 1(one) question from PART-A and 1(one) question from PART-B.
   a. The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks.
   b. The open-ended question set for SEE shall be any other open-ended question and not selected from the experiments under PART-A. It shall be evaluated for 30 marks.
4. For continuous internal evaluation, during the semester, classwork, the typical open-ended questions shall be from PART-B, and any other similar questions to enhance the skill of the students

PART – A
CONVENTIONAL EXPERIMENTS

1. Study of soil profile and collection of soil samples.
2. Determination of soil (pH) and electrical conductivity (EC).
3. Study of the texture of the soil and determination of soil moisture content.
4. Identification of manures, fertilizers and practice of fertilizer application.
5. Determination of bulk density and particle density of soil.
6. Determination of infiltration rate of soil using a double ring infiltrometer.

PART – B
TYPICAL OPEN-ENDED EXPERIMENTS

Open-ended experiments are a type of laboratory activity where the outcome is not predetermined and students are given the freedom to explore, design, and conduct the experiment based on the

problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning.

1. Determination of pore space of soil & soil colour by Munsell chart.
2. Identification of crops and their seeds.
3. Determination of the value of N, P, K in the given sample using chemical method.
4. Preparation of seed bed for sowing and practice sowing operations.
5. Determination of purity and germination percentage of seeds.
6. Identification and working of different tillage implements.

Suggested Learning Resources: (Textbook/ Reference Book/ Manuals):

Textbooks:

1. A Text book of Agronomy. Chandrasekaran, B., Annadurai, K. and Somasundaram, E. New Age International Publishers. 2010.
2. Introduction to Soil Science. Mahendra Sharma. Agrotech Publishing Academy. 2018.
3. Principles of Agronomy, Yellamanda Reddy, T. and SankaraReddi, G. H, Kalyani Publishers, Ludhiana. 4th Edition, 2010.

Reference books / Manuals:

1. Fundamentals of Soil Science, Indian Society of Soil Science, IARI, Jain publications New Delhi, 1998.
2. Introductory Soil Science, Das, D. K, Kalyani Publishers, New Delhi, 4th Edition, 2010.

Web links and Video Lectures (e-Resources):

- http://ecoursesonline.iasri.res.in/Courses/Introduction%20to%20Soil%20Science /SSAC121/Start%20to%20read%20the%20Course.html
- http://ecoursesonline.iasri.res.in/Courses/Principles%20of%20Agronomy%20& %20agrcltrl%20Meteorology/AGRO101/Start%20to%20read%20the%20Course. html
- http://www.hrsacademy.in/wp-content/uploads/2017/02/Principles-of-Agronomyand Agricultural- Meteorology.pdf
- https://www.unaab.edu.ng/attachments/483_SOS%20211%20LECTURE%20NO TE.pdf

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Case study approach - Use real-life agronomic problems to develop student analytical abilities.
- Real-time problem solving in the field
- Hands-on soil profiling and pit studies
- Visit to farmers field and KVK and agricultural industry.

Assessment Structure:
The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).
The CIE Theory component will be 25 marks and CIE Practical component will be 25 marks.

The CIE marks awarded shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for 30 marks. The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to 20 marks. For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.

Rubrics for CIE – Continuous Assessment: 30 marks					
Performance Indicators	**Excellent**	**Good**	**Satisfactory**	**Needs Improveme nt**	**Poor**
Technical Skills & Procedure (PO1 & PO5) (10)	Precise execution of lab techniques (e.g., soil sampling, pH testing, seed germination). No errors in methodology. (9-10)	Minor errors but follows procedures correctly. Understands key concepts. (7-8)	Basic competence but requires guidance. Some procedural mistakes. (5-6)	Frequent errors in techniques (e.g., incorrect soil texture analysis). (3-4)	Unable to perform key tasks (e.g., misusing lab equipment). (0-2)
Safety Compliance (PO6) (5)	Strict adherence to safety (gloves, lab coats, chemical handling). Maintains clean workspace. (5)	Follows safety rules but minor lapses (e.g., forgetting gloves once). (4)	Occasional negligence (e.g., spills not cleaned promptly). (3)	Risky behavior (e.g., improper chemical disposal). (2)	Endangers self/others (e.g., no PPE, unsafe tool use) (0-1)
Interaction with the Group (PO8) (5)	Leads group effectively, shares tasks, and resolves conflicts. (5)	Cooperative and completes assigned role (4)	Passive participant; minimal input. (3)	Reluctant to engage or delays group work. (2)	Disruptive or refuses to collaborate. (1)
Lab Report (PO9) (10)	Report is exceptionally well-organized, detailed, and insightful. All data and analysis are accurate. Submitted on time. (9-10)	Report is complete, well-organized, and accurate. All required sections are present and data is correctly reported. Submitted on time. (7-8)	Report has minor errors in data or analysis, or is missing some minor components. Organization could be clearer. (5-6)	Report is incomplete, contains significant errors, is poorly organized, or is submitted late without a valid reason. (3-4)	Fails to submit a report, or the submitted work is of completely unacceptable quality and lacks critical information. (0-2)

Rubrics for SEE / CIE Test:
(CIE test -To be conducted for 100 marks and the marks obtained shall be reduced to 20)
(SEE-To be conducted for 100 marks)

Performance Indicators	Excellent	Good	Satisfactory	Needs Improvement	Poor
Execution (PO3 & PO5) (8)/ (40)	Flawless execution of techniques (e.g., soil testing, seed treatments). Safe, precise equipment handling. **(7-8) / (33-40)**	Minor errors in parameters (e.g., calibration) but correct overall procedure.. **(5-6) / (25-32)**	Acceptable performanc e with some parameter or handling errors. **(3-4) / (17-24)**	Multiple execution errors; needs frequent correction. **(2) / (9-16)**	Unable to perform operation independently. **(0-1)/ (0-8)**
Result and Discussion (PO4) (7)/ (40)	Accurate data with detailed analysis (e.g., soil fertility trends vs. standards). Insightful conclusions**.** **(7-8) / (33-40)**	Correct results but discussion lacks depth (e.g., limited comparison to theory). **5-6) / (25-32)**	Results mostly correct; discussion basic. **(3-4) / (17-24)**	Results incomplete or partially wrong; weak discussion. **(2) / (9-16)**	No meaningful results or analysis. **(0-1)/ (0-8)**
Viva Voce (PO9) (5)/ (20)	Answers all questions confidently, showing deep conceptual and practical understanding. **(5) / (17-20)**	Answers most correctly; minor conceptual gaps. **(4) / (13-16)**	Answers some but lacks depth. **(3) / (9-12)**	Gives vague or incomplete answers. **(2) / (5-8)**	Unable to answer. **(1) / (0-4)**

- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE component**, a student must secure **a minimum of 35% of 50 marks**, i.e., **18 marks**.
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**.