

| Farm Machinery & Equipment (IPCC)  |  |             |                |
|--|--|-------------|----------------|
| Course Code  | 21AG52   | CIE Marks   | 50             |
| Teaching Hours/Week (L:T:P: S)   | 3:0:2:0  | SEE Marks   | 50             |
| Total Hours of Pedagogy  | 40 hours Theory + 12 Lab slots   | Total Marks | 100            |
| Credits  | 04   | Exam Hours  | 03             |
| <i>* Additional one hour may be considered for Instructions if required</i>  |  |             |                |
| <b>Course objectives:</b> <ul style="list-style-type: none"> <li>To recognize the importance of tillage operation in agricultural production.</li> <li>To explain the role of earth moving machinery during land preparation process.</li> <li>To identify the various types of seeding, inter cultivation tools and plant protection equipment used in agricultural production.</li> <li>To know about the working principle and functions of various machine parts of mowers, reapers, windrowers, forage harvesters, threshers, combine harvesters, cotton strippers, cotton pickers, groundnut and potato and sugarcane harvesters.</li> </ul>   |  |             |                |
| <b>Teaching-Learning Process (General Instructions)</b><br>These are sample strategies; which teachers can use to accelerate the attainment of the various course outcomes. <ol style="list-style-type: none"> <li>Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Video demonstrations or Simulations.</li> <li>Chalk and Talk method for Problem Solving.</li> <li>Arrange visits to show the live working models other than laboratory topics.</li> <li>Adopt collaborative (Group Learning) Learning in the class.</li> <li>Adopt Problem Based Learning (PBL), which fosters students Analytical skills and develops thinking skills such as evaluating, generalizing, and analyzing information.</li> <li>Conduct Laboratory Demonstrations and Practical Experiments to enhance experiential skills</li> </ol> |  |             |                |
| <b>MODULE-1</b>  |  |             | <b>8 HOURS</b> |
| Objectives of farm mechanization. Classification of farm machines. Materials of construction & heat treatment. Principles of operation and selection of machines used for production of crops. Field capacities & economics.   |  |             |                |
| <b>Teaching-Learning Process</b>   | 1. PowerPoint Presentation<br>2. Chalk and Talk are used for Problem Solving (In-general)<br>3. Video demonstration or Simulations<br>4. Laboratory Demonstrations and Practical Experiments |             |                |
| <b>MODULE-2</b>  |  |             | <b>8 HOURS</b> |
| <b>Tillage:</b> Classification and types of tillage, Primary tillage implements- Mould board plough and its parts, Disc plough, and other ploughs, Secondary tillage equipment's -Disc harrows, Cultivators, and intercultural implements., Draft and unit draft related problems.   |  |             |                |
| <b>Teaching-Learning Process</b>   | 1. PowerPoint Presentation<br>2. Chalk and Talk are used for Problem Solving (In-general)<br>3. Video demonstration or Simulations<br>4. Laboratory Demonstrations and Practical Experiments |             |                |
| <b>MODULE-3</b>  |  |             | <b>8 HOURS</b> |
| <b>Seeding Methods</b><br>Seeding methods, Different types of seed metering mechanism, different types of furrow openers. Calibration of Seed drills. Transplanting methods, different types of Transplanting machinery and their working principle. Fertilizer application equipment –fertilizer meeting mechanism.   |  |             |                |
| <b>Teaching-Learning Process</b>   | 1. PowerPoint Presentation<br>2. Chalk and Talk are used for Problem Solving (In-general)<br>3. Video demonstration or Simulations<br>4. Laboratory Demonstrations and Practical Experiments |             |                |
| <b>MODULE-4</b>  |  |             | <b>8 HOURS</b> |



|   |  |
|---|--|
| <b>Plant Protection Equipment</b><br>Weed control and Plant protection equipment - sprayers and dusters, their calibration, selection, constructional features of different components and adjustments.   |  |
| <b>Teaching-Learning Process</b>  | 1. PowerPoint Presentation<br>2. Chalk and Talk are used for Problem Solving (In-general)<br>3. Video demonstration or Simulations<br>4. Laboratory Demonstrations and Practical Experiments |
| <b>MODULE 5</b> <span style="float: right;"><b>8 HOURS</b></span>   |  |
| <b>Harvesting Machinery</b><br>Crop harvesting machinery: mowers, windrowers, reapers, reaper binders and forage harvesters. Fruit harvesting tools and machines. Threshers - various types of threshers, grain combine, maize harvester, root crop harvesting equipment-potato, groundnut etc., Cotton picker & Sugarcane harvesting equipment. Testing of farm machine. |  |
| <b>Teaching-Learning Process</b>  | 1. PowerPoint Presentation<br>2. Chalk and Talk are used for Problem Solving (In-general)<br>3. Video demonstration or Simulations<br>4. Laboratory Demonstrations and Practical Experiments |

**PRACTICAL COMPONENT OF IPCC** *(May cover all / major modules)*

| Sl.NO  | Experiments   |
|--|---|
| 1  | Study the constructional details and performance testing of Mould board plough  |
| 2  | Study the constructional details and performance testing of Disc plough   |
| 3  | Study the constructional details of Disc harrows and cultivators.   |
| 4  | Study the constructional details of rotavator   |
| 5  | Maintenance and adjustments of primary and secondary tillage implements.  |
| 6  | Numerical problems related to tillage implements – Field capacity, field efficiency and size of Tractor etc.                            |
| 7  | Study the constructional details of different types of seed drills.   |
| 8  | Numerical problems on seed cum fertilizer drills – calibration, cost of operation and field capacity etc.                               |
| 9  | Demonstrate the performances testing of inter cultivation implements.   |
| 10   | Demonstrate the working of sprayers and measurement of nozzle discharge and field capacity  |
| 11   | Demonstrate the working of Mower and Reaper   |
| 12   | Familiarization with various farm machines related to grain harvesting, root crop harvesting, forage harvester and threshing operation. |
| <b>Course outcomes (Course Skill Set):</b><br>At the end of the course the student will be able to: <ul style="list-style-type: none"> <li>• Classify the types of tillage and tillage tools.</li> <li>• Determine the various forces acting on tillage tools</li> <li>• Distinguish the various methods involved in sowing, inter cultivation and plant protection operation</li> <li>• Categorize the various types of sowing, inter cultivation and plant protection equipment</li> <li>• Apply basic knowledge of the crop harvesting machineries</li> <li>• Understand about testing of farm machine</li> </ul> |   |
| <b>Assessment Details (both CIE and SEE)</b><br>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have  |   |

satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

#### **CIE for the theory component of IPCC**

Two Tests each of **20 Marks (duration 01 hour)**

- First test at the end of 5<sup>th</sup> week of the semester
- Second test at the end of the 10<sup>th</sup> week of the semester

Two assignments each of **10 Marks**

- First assignment at the end of 4<sup>th</sup> week of the semester
- Second assignment at the end of 9<sup>th</sup> week of the semester

Scaled-down marks of two tests and two assignments added will be CIE marks for the theory component of IPCC for **30 marks**.

#### **CIE for the practical component of IPCC**

- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The **15 marks** are for conducting the experiment and preparation of the laboratory record, the other **05 marks shall be for the test** conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to 15 marks.
- The laboratory test (**duration 03 hours**) at the end of the 15<sup>th</sup> week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to 05 marks.

Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **20 marks**.

#### **SEE for IPCC**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.

**The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper shall include questions from the practical component).**

- The minimum marks to be secured in CIE to appear for SEE shall be the 12 (40% of maximum marks-30) in the theory component and 08 (40% of maximum marks -20) in the practical component. The laboratory component of the IPCC shall be for CIE only. However, in SEE, the questions from the laboratory component shall be included. The maximum of 04/05 questions to be set from the practical component of IPCC, the total marks of all questions should not be more than the 20 marks.  
SEE will be conducted for 100 marks and students shall secure 35% of the maximum marks to qualify in the SEE. Marks secured will be scaled down to 50.



**Suggested Learning Resources:****Books****TEXT BOOKS:**

1. Bosoi, E.S. (1990). Theory, Construction and Calculation of Agricultural Machines (Vol. 1 and 2). Oxonion Press Pvt. Ltd., New Delhi.
2. Donnel Hunt. Farm Machinery and management. Iowa State University Press, Ames, USA.
3. Ghosh, P.K, and Swain, S. (1993). Practical Agricultural Engineering, NayaProkash, Calcutta. 4. Kelnin, N.I., Popov, I.F., and Sakun, V.A. (1985). Agricultural Machines. Amerind Publishers, New Delhi. 5. Srivastava, A.C. (1990). Elements of Farm Machinery. Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi.

**REFERENCE BOOKS:**

1. Kepner, R.A., Bainer Roy, and Barges, E.C. Principals of Farm Machinery, . CBS Publishers and Distributors, Delhi-17.
2. Kurtz, G.L., Thompson and Claer, P. (1984). Design of Agricultural Machinery. John Wiley & Sons, New York.
3. Michael, A. M. and Ojha, T.P. (1985). Principles of Agricultural Engineering. (Vol. II). Jain brothers, New Delhi.
4. Smith Harris Pearson, H.E., and Lambent Herry Wilkes, M.S. (1977).
5. Farm Machinery and Equipment. Tata McGraw-Hill Publishing Company Ltd., New Delhi.
6. Kanafoshi, C.Z. and Karwawshi, T. (1976). Agricultural Machines, Theory and Construction (Vol. 1 and 2). USDA, Poland.

**Web links and Video Lectures (e-Resources):**

[https://www.youtube.com/watch?v=PEojc\\_K7u9U&list=PLbRMhDVUMngfpJp\\_tkeFAy\\_qF20vlwn3k](https://www.youtube.com/watch?v=PEojc_K7u9U&list=PLbRMhDVUMngfpJp_tkeFAy_qF20vlwn3k)  
<https://www.youtube.com/watch?v=d5PTKHRw2FQ>  
<https://www.youtube.com/watch?v=bep6esGP2XE>  
[https://en.wikipedia.org/wiki/List\\_of\\_agricultural\\_machinery](https://en.wikipedia.org/wiki/List_of_agricultural_machinery)

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

- Quizzes
- Assignments
- Seminars
- Mini Projects

  
**H.O.D.**

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