ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

(A Unit of Alva's Education Foundation)
Shobhavana Campus, Mijar-574225, Moodbidri, D.K,
Affiliated to VTU Belagavi and Approved by AICTE, New Delhi
(Accredited by NAAC with A+ Grade)

CALENDAR OF EVENTS (B.E. EVEN/ MBA ODD SEMESTER 2023-24)

VISION

"Transformative education by pursuing excellence in Engineering and Management through enhancing skills to meet the evolving needs of the community"

MISSION

- To bestow quality technical education to imbibe knowledge, creativity and ethos to students community.
- To inculcate the best engineering practices through transformative education.
- To develop a knowledgeable individual for a dynamic industrial scenario.
- To inculcate research, entrepreneurial skills and human values in order to cater the needs of the society.

WEEK	MONTH	MON	TUE	WED	THU	FRI	SAT	SUN	ACTIVITIES
01	JANUARY 2024	1	2	3	4	5	6	7	14: Makara Sankranti 26: Republic Day 30-31: Student Mentoring
02		8	9	10	11	12	13	[redacted]	
03		15	16	17	18	19	20	21	
04		22	23	24	25	[redacted]	27	28	
05		29	30	31					
06	FEBRUARY 2024				1	2	3	4	7: Commencement of I Semester MBA 12: Commencement of VIII Semester 28-29: Student Mentoring
07		5	6	7	8	9	10	11	
08		12	13	14	15	16	17	18	
09		19	20	21	22	23	24	25	
10		26	27	28	29				
11	MARCH 2024					1	2	3	6: Commencement of II Semester 8: Maha Shivaratri 9: Last Working Day of V Semester 25-26: CIE Test – I for VIII Semester 26-28: CIE Test – I for I Semester MBA 27-28: Student Mentoring 29:Good Friday
12		4	5	6	7	[redacted]	9	10	
13		11	12	13	14	15	16	17	
14		18	19	20	21	22	23	24	
15		25	26	27	28	[redacted]	30	31	
16	APRIL 2024	1	2	3	4	5	6	7	9: Yugadi 11: Ramadan 15: Commencement of IV Semester 20-24: CIE Test – I for II Semester 20-22: CIE Test – II for VIII Semester 24-26: CIE Test – II for I Semester MBA 29-30: Student Mentoring
17		8	[redacted]	10	[redacted]	12	13	14	
18		15	16	17	18	19	20	21	
19		22	23	24	25	26	27	28	
20		29	30						
21	MAY 2024			[redacted]	2	3	4	5	1: May Day 9-11: CIE Test – III for VIII Semester 10: Basava Jayanthi/ Akshaya Trithiya 11: Last Working Day of VIII Semester 23-25: CIE Test – III for I Semester MBA 24-27: CIE Test – I for IV Semester 29: Last Working Day of I Semester MBA 30-31: Student Mentoring
22		6	7	8	9	[redacted]	11	12	
23		13	14	15	16	17	18	19	
24		20	21	22	23	24	25	26	
25		27	28	29	30	31			
26	JUNE 2024						1	2	15-20: CIE Test – II for II Semester 17: Bakrid 22-25: CIE Test – II for IV Semester 27-28: Student Mentoring 29: Last Working Day of II Semester
27		3	4	5	6	7	8	9	
28		10	11	12	13	14	15	16	
29		[redacted]	18	19	20	21	22	23	
30		24	25	26	27	28	29	30	
31	JULY 2024	1	2	3	4	5	6	7	17: Muharram 20-23: CIE Test – III for IV Semester 25-26: Student Mentoring 27: Last Working Day of IV Semester
32		8	9	10	11	12	13	14	
33		15	16	[redacted]	18	19	20	21	
34		22	23	24	25	26	27	28	

Approved by IQAC Chairman

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

ALVA'S

Shobhavana Campus, Mijar, Moodbidri, D.K – 574225

Phone: 08258-262725, Fax: 08258-262726

DEPARTMENT OF AGRICULTURE ENGINEERING

Time Table even Semester 2023-24 (w.e.f 29/04/2024)

Academic Year	Scheme	Semester	Section	Class Coordinator	Room No
2023-24	2022	4	A	Dr. Surajit Deb Barma	501

Time / Day	9.00 To 9.50	9.50 To 10.40	10.40 To 11.00	11.00 To 11.50	11.50 To 12.40	12.40 To 1.40	1.40 To 2.30	2.30 To 3.20	3.30 To 5.00
MONDAY	TFM (VMB)	TAE (SK)	BREAK	LIB/MINI Project	UHV (SK)	LUNCH	APE LAB (KR)		
TUESDAY	IDA (SDB)			TAE (SK)	APE (KR)		TFM (VMB)	B.E (PK)	
WEDNESDAY	TSC (KR)			TFM (VMB)	APE (KR)		MD (KCH/KR)		
THURSDAY	TAE (SK)	APE (KR)		APT (VMB)			TAE LAB (SK)		
FRIDAY	TFM (VMB)	TSC (KR)		TAE (SK)	APE (KR)		MD (KCH/KR)		P.E/NSS/Yoga/ Mentoring
SATURDAY	TSC (KR)	TFM (VMB)		TAE (SK)	APE (KR)				

Allocation of Courses

			COURSE TITLE	FACULTY NAME	FACULTY CODE
PCC	FFM	BAG401	Thermodynamics & Fluid Mechanics	Dr. Vinuta M Betageri	VMB
IPCC	TAE	BAG402	Tractor & Automotive Engines	Dr. Shashikumar	SK
IPCC	APE	BAG403	Agricultural Process Engineering	Dr. K.Raju Yadav	KR
PCCL	MD	BAGL404	Machine drawing and GD & T lab	Prof Kiran CH/ Dr. K. Raju Yadav	SP/KR
ESC	TSC	BAG405A	Tractor Systems and Controls	Dr. K.Raju Yadav	KR
AEC/ SEC	IDA	BAGL456C	Introduction to Data Analytics	Dr. Surajit Deb Barma	SDB
[illegible]	BE	BBOK407	Biology for Engineers	Dr. Prasanth Donkar	PD
	UHV	BUHK408	Universal Human values Course	Dr. Shashikumar	SK
	APT		Aptitude	Dr. Vinuta M Betageri	VMB

PCC: Professional Core Course, **PCCL:** Professional Core Course laboratory, **UHV:** Universal Human Value Course, **SC(IC):** Applied Science Course, **ESC:** Engineering Science Course, **ETC**: Emerging Technology Course, **PLC**: Programming Language Course, **AEC:** Ability Enhancement Course, **SEC**: Skill Enhancement Course, **HSMC:** Humanity & Social Science and Management Couse, **SDC:** Skill Development Course

Time Table Coordinator | H.O.D | Dean (Academics) | Principal

H.O.D.
Dept. of Agricultural Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodubidire - 574225

PRINCIPAL
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225, D.K

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Shobhavana Campus, Mijar, Moodabidri, Mangalore Taluk, D.K – 574225
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DEPARTMENT OF AGRICULTURE ENGINEERING

INDIVIDUAL TIMETABLE (EVEN SEMESTER 2023-24)

Name of the Faculty	Dr. K. Raju Yadav (KR)						With Effect From: 29-04-2024			
Period	1	2		3	4		5	6	7	No. of Units
Time / Day	09.00 –09.50	09.50 – 10.40	TEA BREAK	11.00-11.50	11.50-12.40	LUNCH BREAK	1.40-2.30	2.30-3.20	3.20-5.00	
Monday					LIB		APE LAB (4 SEM)			4
Tuesday					APE (4 SEM)		GATE (K)	MINI PROJECT		5
Wednesday	TSC (4 SEM)				APE (4 SEM)		MD (4 SEM)			6
Thursday		APE (4 SEM)								2
Friday		TSC (4 SEM)			APE (4 SEM)		MD (4 SEM)			6
Saturday	TSC (4 SEM)				APE (4SEM)					4

Other Activities: CLASS COORDINATOR, TIMETABLE COORDINATOR, ERP COORDINATOR, DEPARTMENT MENTORSHIP, NPTL COORDINATOR, EDC COORDINATOR, IA COORDINATOR, NSS COORDINATOR, JAGRUTHI MENTORSHIP, NAAC COORDINATOR, NBA CRITERIA 8 COORDINATOR

Total Units*: **30**

* EXCLUDING OTHER ACTIVITIES

PARTICULARS	HOURS	TOTAL HOURS	TOTAL UNITS
THOERY	11	22	22
LAB	2+3+2+1	8	8
OTHERS			30

Coordinator

HOD

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Dept. of Agricultural Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodubidire - 574225

AGRICULTURAL PROCESS ENGINEERING			
Course Code	**BAG403**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	(4:0:0:0)	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	03
Examination nature (SEE)	Theory		

Course Objectives:

- To train the students on unit operations of agricultural process engineering
- To acquaint with the engineering properties of agricultural materials
- Enable the students to understand the concepts of cleaning of cereals, size reduction and rice milling

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Video demonstrations or Simulations.
2. Chalk and Talk method for Problem Solving.
3. Arrange visits to show the live working models other than laboratory topics.
4. Adopt collaborative (Group Learning) Learning in the class.
5. Adopt Problem Based Learning (PBL), which fosters students Analytical skills and develops thinking skills such as evaluating, generalizing, and analyzing information.
6. Conduct Laboratory Demonstrations and Practical Experiments to enhance experiential skills.

Module-1 **8 HOURS**

Physical characteristics of different food grains: fruits and vegetables – importance, Shape and size – criteria for describing shape and size, Roundness and sphericity – Volume and density – Specific gravity – Bulk density Porosity – surface area.

Rheology – basic concepts, ASTM standard definition of terms, Rheological Properties – Force deformation behavior, stress and strain behavior, Visco elasticity – time effects, Rheological models - Kelvin and Maxwell models, electrical equivalence of mechanical models.

Module-2 **8 HOURS**

Frictional Properties: Friction in agricultural materials – measurement – rolling resistance – angle of internal friction and angle of repose, Aerodynamics of agricultural products – drag coefficient and terminal velocity.

Electrical properties – Di electrical properties, Thermal Properties – specific heat – thermal conductivity-thermal diffusivity. Application of engineering properties in handling and processing equipment.

Module-3 **8 HOURS**

Theory of separation: Types of separators, Cyclone separators, Size of screens applications, Separator based on length, width and shape of the grains, specific gravity, density, Air-screen grain cleaner principle and types, Design considerations of air screen grain cleaners, Sieve analysis-particle size determination, Ideal screen and actual screen– effectiveness of separation and related problems, Pneumatic separator, Cleaning and separation equipment's.

Module-4 **8 HOURS**

Scope and importance of crop processing: Principles and methods of food processing- cleaning and grading of cereals, Size reduction –principle of comminution/ size reduction, mechanisms of comminution of food, particle shape, average particle size, Characteristics of comminuted products, crushing efficiency, Determination and designation of the fineness of ground material, screen analysis, Empirical relationships (Rittinger_s, Kick_s and Bond_s equations), Work index, energy utilization, Size reduction equipment – Principal types, crushers (jaw crushers, gyratory, smooth roll), Hammer mills, Attrition mills, Burr mill, Tumbling mills, Action in tumbling mills, Size reduction equipment –Ultra fine grinders (classification hammer mills, colloid mill), Cutting machines.

Module-5 **8 HOURS**

Milling - Rice milling: Principles and equipments, Paddy parboiling methods and equipment, Wheat milling, Milling of Pulses, wet millig, dry milling and milling efficiency. Theory of filtration, Rate of filtration, Applications, Constant rate filtration and Constant-pressure filtration derivation of equation, Filtration equipment, Plate and frame filter press, Rotary filters and tubular filters.

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

Sl.NO	Experiments
1	Preparation of flow charts and layout of a food processing plant
2	Mixing index and study of mixers
3	Determination of fineness modulus and uniformity index
4	Determination of mixing index of a feed mixer
5	Determination of the efficiency of cyclone separator
6	Tutorial on use of psychometric chart
7	Tutorial on power requirement in size reduction of grain using Ratzinger's law, Kicks law and Bond's law
8	Performance evaluation of hammer mill and attribution mill.
9	Separation behaviour in pneumatic separation

Course outcomes (Course Skill Set):

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

- Be proficient in the scope of the process engineering and the use of processing machinery
- Understand the physical properties, rheological properties and frictional properties of agricultural materials
- Summarising the thermal properties, electrical properties and the terms related to the machine design aspects
- Some of the basic concepts related to cleaning and size reduction equipments
- To acquaint the students with the milling of rice, parboiling technologies and milling of pulses and oil seeds
- Understand the filtration equipments

Assessment Details (both CIE and SEE)

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 out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 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 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 the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- 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 02/03 hours)** after completion of all the experiments shall be conducted for 50 marks and scaled down to **10 marks.**
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

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.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

- **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 may 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

1. Unit Operations of Agricultural Processing, Sahay KM and Singh KK 1994, Vikas Publishing House Pvt. Ltd., New Delhi.
2. Post Harvest Technology of Cereals, Pulses and oil seeds, Chakraverty A 1988. Oxford and IBH Publishing Co. Ltd., Calcutta.
3. Unit Operations of Chemical Engineering, McCabe WL, Smith JC and Harriott P 2017 McGraw-Hill Book Co., Boston.
4. Transport Processes and separation Process Principle, Geankoplis C J 2015 Prentice-Hall Inc., New Jersey.
5. Unit operations in Food processing, Earle R L 1983. Pergamon Press, New York
6. file:///C:/Users/DELL/Downloads/AlabmanualonAgriculturalProcessingandStructures.pdf
7. Post Harvest Technology of Cereals, Pulses and oil seeds, Chakraverty A 1988. Oxford and IBH Publishing Co. Ltd., Calcutta.

Web links and Video Lectures (e-Resources):

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

- Quizzes
- Assignments
- Seminars

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ALVA'S
Education Foundation

ATTENDANCE BOOK

Academic Year : 2023 - 2024

Semester : IV Section A

Period of the Semester : From 15/4/2024 to 27/7/24

Subject with Code : AGRICULTURAL PROCESS ENGINEERING (BAG403)

Name of the Faculty : DR K. RAJU YADAV

Department : AGRICULTURAL ENGINEERING

VISION OF THE INSTITUTE
"Transformative education by pursuing excellence in Engineering and Management through enhancing skills to meet the evolving needs of the community"

MISSION OF THE INSTITUTE

- To bestow quality technical education to imbibe knowledge, creativity and ethos to students community.
- To inculcate the best engineering practices through transformative education.
- To develop a knowledgeable individual for a dynamic industrial scenario.
- To inculcate research, entrepreneurial skills and human values in order to cater the needs of the society.

VISION OF THE DEPARTMENT

To serve the country by producing high caliber technocrats who can combine farming with engineering and technology interventions and contribute to global food security and sustainable growth in agricultural production

MISSION OF THE DEPARTMENT

M1 : To impart knowledge by establishing an environment that is conducive to teaching and learning.

M2 : To create agricultural engineers who are both technically proficient and morally admirable in order to benefit society.

M3 : To develop and enhance novel technologies to address current and foreseeable issues in agriculture.

COURSE OUTCOMES

CO1	Be proficient in the scope of the process engineering and use of processing machinery
CO2	understand the physical properties. rheological properties and frictional properties
CO3	summarizing the thermal properties. Electrical properties and them terms related to the therm
CO4	Some of the basic concept related cleaning drying and size reduction equipments.
CO5	to acquaint the student with milling of rice parboiling technologies & milling of pu
CO6	understand the material handling & transportation equipment

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2						2									
CO2					2	2		2								
CO3		2	2	2	2	2	2	2	2						1	2
CO4	2	2	2	2	2	2	2	2						2	1	2
CO5				2								2	1	1		1
CO6	2	2								2	2		1	1		
													1		1	1

AIET	Lesson Plan & Execution	Format No. Issue No. Rev. No.	ACD 08 01 00

Name of the faculty	Dr. K. Raju Yadav
Semester and Section	IVth & A section
Date of Commencement	29/4/24
Last Working Day of the Semester	7/8/24
Source Materials List	
1. Sahay KM & Singh KK	Unit operations of Agricultural Processing
2. Chakraverty	Post Harvest technology of cereals, pulses & oils
3. Geankoplis C	Transport processes & separating process principle
4. Earle R L	Unit operation in Food processing
5.	

Subject Name Agricultural Process Engineering

Period	Plan			Execution		
	Date	Topics to be covered	Source Material needed	Topics Covered	Date	Source Material Referred
1	30/4	Introduction to unit operation in Ag. processing	3	Introduction to unit operations in Ag. processing	30/4	3
2	2/5/24	structure of paddy & wheat grain	1	structure of paddy & wheat grain	2/5/24	1
3	8/5/24	physical property of food grains	2	physical property of food grains	8/5	2
4	9/5/24	Flow chart of Rheology	3	Flow chart of Rheology	9/5	3

Period	Plan			Execution		
	Date	Topics to be covered	Source Material needed	Topics Covered	Date	Source Material Referred
5	10/5/24	Derivation of kelvin model	4	Derivation of kelvin model	10/5	4
6	16/5/24	Derivation of maxwell model	1	Derivation of maxwell model	16/5	1
7	18/5/24	Types of Newtonian & non newtonian fluids	3	Types of Newtonian & non newtonian fluid	18/5	3
8	21/5/24	physiologic, electrical properties	1	physiological & electrical properties	21/5	1
9	28/5/24	Revision class for 1st module	2	Revision class for 1st module	28/5	2
10	31/5/24	Introduction about cleaning, grading	4	Introduction to cleaning & grading	31/5	4
11	5/6/24	Types of screens class of screens	1	Types & class of screens	5/6	1
12	6/6/24	Derivation of screen Effectiveness of	3	Derivation of Eff of screens	6/6	3
13	7/6/24	Types of separators	2	Types of separators	7/6	2
14	14/6/24	magnetic & Electric class separator pneumatic	3	magnetic & class separator pneumatic	14/6	3
15	15/6/24	cyclone separator	1	cyclone separator	15/6	1
16	18/6/24	problems on cyclone separator	2	problems on cyclone separator	18/6	2
17	20/6/24	Revision class on 3rd module	4	Revision class on 3rd module	20/6.	4

Period	Plan			Execution		
	Date	Topics to be covered	Source Material needed	Topics Covered	Date	Source Material Referred
18	9/7/24	Introduction to modern rice mill	4	Introduction to modern rice mill	9/7	4
19	9/7/24	Flow chart of modern rice mill	2	Flow chart of modern rice mill	9/7	2
20	9/7/24	Flow chart for dry milling	3	Flow chart for dry milling	9/7	3
21	11/7/24	Flow chart for wet milling	2	Flow chart for wet milling	11/7	2
22	11/7/24	Condensation & parabaking steps	1	condensation & parabaking steps	11/7	1
23	12/7/24	Hydraulic press	1	Hydraulic press	12/7	1
24	12/7/24	Screw press	3	Screw press	12/7	3
25	15/7/24	Revision class	2	Revision class	15/7	2
26	15/7/24	Revision class	4	Revision class	15/7	4
27	16/7/24	summary & conclu about 5th module	3	summery & conclu about 5th module	16/7	3
28	18/7/24	Introduction to 4th module	2	Introduction to 4th module	18/7	2
29	18/7/24	Size reduction procedure	2	size reduction procedure	18/7	2
30	20/7/24	Jaw crusher & gyratory crusher	1	Jaw crusher & gyratory crusher	20/7	1

Period	Plan			Execution		
	Date	Topics to be covered	Source Material needed	Topics Covered	Date	Source Material Referred
31	20/7/24	Ball mill	1	Ball mills	20/7	1
32	22/7/24	Hammer mill	2	Hammer mill	22/7	2
33	22/7/24	equation for crushing efficiency	3	equation for crushing efficiency	22/7	3
34	23/7/24	Rattinger law Kicks law & Bondy law	4	Rating law Kicks law Bonds law.	23/7	4
35	23/7/24	problems on Kicks & Bondy law	3	problems on Kicks & Bondy law	23/7	3
36	24/7/24	overview of 4th module	2	overview of 4th module	24/7	2
37	24/7/24	Revision for 5th module	1	Revision for 5th module.	24/7	1
38	25/7/24	Introduction to 2nd module	3	Introduction to 2nd module.	25/7	3
39	25/7/24	Introduction to Friction proper	3	Introduction to Frictional prop	25/7	3
40	30/7/24	Introduction to Thermal property	2	Introduction to Thermal property	30/7	2
41	31/7/24	Derivation for Drag Cefficient	2	Derivation for Drag cofficient	31/7	2
42	31/7/24	Derivation for Terminal velocity	1	Derivation for Terminal velocity	31/7	1
43	3/8/24	problems	4	problems	3/8	4

Period	Plan			Execution		
	Date	Topics to be covered	Source Material needed	Topics Covered	Date	Source Material Referred
44	3/8/24	Sum Heat capacity	2	Heat capacity	3/8	2
45	5/8/24	Summary & conclu of 2nd module	3	summary & con of 2nd module	5/8	3
46	5/8/24	Explation of IA-1 question	1	Explation of IA-1 paper	5/8	1
47	6/8/24	Explan of IA-2 paper	2	Explan of IA-2 paper	6/8	2
48	6/8/24	Explantion of IA-3 paper	4	Explan of IA-3 paper	6/8	4
49	7/8/24	Discuss of Important question	1	Discuss of Important question	7/8	1

Others	Planned	Actual	Remarks
Special Classes	2	2	
Tutorials			
Assignments	2	2	
Seminars			
IA Tests	3	2	
Portions Covered in the entire Semester	100%		
Course Effectiveness	92%		
Students Feedback	very good		
Students Responce	positive Response		

Result	No. of Students AP	No. of Students Passed	% of Result
	23	23	100

Faculty in Charge

Signature of Principal (& Remarks if any)

HOD's Signature

H.O.D.
Dept. of Agricultural Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodubidire - 574225

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

MIJAR, MOODBIDRI - 574 225

ATTENDANCE CUM INTERNAL

Class

Subject: Agricultural Process Engineering

Subject

No. of Classes held: 49

Sl No	USN	Name	1 (30/4)	2 (2/5)	3 (3/5)	4 (8/5)	5 (9/5)	6 (10/5)	7 (16/5)	8 (18/5)	9 (21/5)	10 (28/5)	11 (31/5)	12 (5/6)	13 (6/6)	14 (7/6)	16 (.../6)	17 (10/6)	18 (20/6)	19 (2/7)	20 (9/7)	21 (.../7)	22 (11/7)	23 (14/7)	24 (12/7)	25 (12/7)	26 (13/7)	27 (15/7)	28 (16/7)	29 (16/7)	30 (18/7)
1	4AL22AG001	AKSHATA GANGADHAR SUNKAD	P	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
2	4AL22AG002	DEEPAK J	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P
3	4AL22AG003	DEEPIKA Y	P	P	P	A	P	P	P	P	P	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
4	4AL22AG004	ESHA S	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
5	4AL22AG005	GURUPRASAD N	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
6	4AL22AG006	KASTURI C	P	P	A	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
7	4AL22AG007	M B KRUPA	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
8	4AL22AG008	N HARIYANTH KUMAR	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	(A)	P	P	(A)	A	P	P	P
9	4AL22AG009	NAVEEN NAYAK	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
10	4AL22AG010	NIHAR S ACHARYA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	(A)	(P)	P	P	P	P	P
11	4AL22AG011	NIKITHA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	(A)	(P)	P	P	P
12	4AL22AG012	NITHIN M SHETTY	A	A	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	(A)	(A)	P	P	P
13	4AL22AG013	PRAJNA SHREE JAIN	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
14	4AL22AG014	PRANJAL P POOJARY	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	(A)	(A)	P	P	P
15	4AL22AG015	PRAPTHI N S	P	P	P	P	P	P	P	P	P	P	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
16	4AL22AG016	PUNEETH	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
17	4AL22AG017	RAJITH S SHETTY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	4AL22AG019	SAMANSH Y SUVARNA	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	(A)	(P)	P	(A)	P	P	P
19	4AL22AG020	SUMA M G	A	A	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	(A)	(A)	P	P	P	P	P	P	P
20	4AL22AG021	THEJAS A V	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
21	4AL22AG022	THRUPTHI S RAI	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
22	4AL22AG023	VEERESH S METI	A	A	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
23	4AL22AG024	VISHWANATH D CHAVADANNAVAR	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
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30																															
Staff Initials																															

Sl No	...cted 60	No. of Class Attended	% of Attendance	Internal Assessment (50) I	II	III	Average Marks
1		45	91.8	23	29	30	15
2		44	89.7	18	22	29	13
3		48	97.9	17	24	16	10
4		45	91.8	29	30	30	15
5		46	93.8	19	28	30	15
6		48	97.9	23	29	30	15
7		45	91.8	26	28	28	14
8		49	100	24	30	22	14
9		47	95.9	29	29	30	15
10							
11		47	95.9	25	26	30	14
12		44	95.9	29	27	30	15
13		44	89.7	9	14	17	8
14		40	100	28	30	30	15
15		42	85.7	16	23	A	10
16		46	93.8	29	30	30	15
17		46	100	17	21	25	11
18		44	89.7	25	25	30	14
19		40	89.7	27	30	28	14
20		44	89.7	24	28	20	13
21		49	100	29	30	29	15
22		49	100	29	30	30	15
23		42	85.7	17	14	A	8
24		44	89.7	19	27	14	12
25							
26							
27							
28							
29							
30							
Staff Initials							

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

MIJAR, MOODBIDRI - 574 225

Class

Subject : Agricultural Process Eng

No. of Classes held : 49

Subject

Sl No	U.S.N.	Name	1	31	32	33	34	35	36	37	38	39	40	41	42	43	44	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
		Date / Month	30/4	20/7	21/7	22/7	23/7	23/7	24/7	24/7	25/7	25/7	30/7	31/7	31/7	3/8	3/8	5/8	6/8	6/8	7/8											
1	4AL22AG001	AKSHATA GANGADHAR SUNKAD	P	P	P	P	P	P	A	A	P	P	P	P	P	P	P	P	P	P	P											
2	4AL22AG002	DEEPAK J	A	P	A	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
3	4AL22AG003	DEEPIKA Y	P	P	P	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P											
4	4AL22AG004	ESHA S	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P											
5	4AL22AG005	GURUPRASAD N	P	P	P	P	P	P	P	P	P	P	P	A	A	P	P	P	P	P	P											
6	4AL22AG006	KASTURI C	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
7	4AL22AG007	M B KRUPA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
8	4AL22AG008	N HARIYANTH KUMAR	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
9	4AL22AG009	NAVEEN NAYAK	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
10	4AL22AG010	NIHAR S ACHARYA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
11	4AL22AG011	NIKITHA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
12	4AL22AG012	NITHIN M SHETTY	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
13	4AL22AG013	PRAJNA SHREE JAIN	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
14	4AL22AG014	PRANJAL P POOJARY	P	P	P	P	P	P	A	P	A	P	A	A	P	P	P	P	P	P	P											
15	4AL22AG015	PRAPTHI N S	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P											
16	4AL22AG016	PUNEETH	P	P	P	P	A	P	A	P	P	P	A	P	P	P	P	P	P	P	P											
17	4AL22AG017	RAJITH S SHETTY	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
18	4AL22AG019	SAMANSH Y SUVARNA	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
19	4AL22AG020	SUMA M G	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
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21	4AL22AG022	THRUPTHI S RAI	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P											
22	4AL22AG023	VEERESH S METI	A	P	P	P	P	A	P	P	A	P	P	A	A	P	P	[illegible]	P	P	P											
23	4AL22AG024	VISHWANATH D CHAVADANNAVAR	A	P	P	P	P	P	P	A	P	P	A	P	P	P	P	P	P	A	P											
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AIET	ASSIGNMENTS	Format No. Issue No. Rev. No.	ACD 10 01 00

Department	Agriculture Engineering	Academic Year	2023-2024
		Semester	IVth

Sl.No.	Title	Books / Journals / Magazines referred	Date of Announcement	Date of Submission	Signature of the faculty
1.	Assignment -1	physical & physiological properties fruits & vegetables	15/6/24	18/6/24	[signature]
2.	Assignment -2	Design consideration Air clean grain Cleaner	10/7/24	12/7/24	[signature]

AIET	INTERNAL EXAM RESULT ANALYSIS	Format No. Issue No. Rev. No.	ACD 12 01 00

Department	Agriculture Engineering	Semester	IVth
		Subject Code	BAG403
Total No. of Students	23	Academic Year	2023-2024

Test	Date	Number of Students				Signature		Remarks
		Attended	0-14	15-20	21-25	Faculty	HOD	
T_1	30/6/24	23	1	7	15	[signature]	[signature]	
T_2	5/7/24	23	2	0	21	[signature]	[signature]	
T_3	26/7/24	21	2	0	19	[signature]	[signature]	
T_4								
T_5								

[signature]
Signature of Staff in - charge

[signature]
HOD's Signature

H.O.D.
Dept. of Agricultural Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodubidire - 574225

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY
(Unit of Alva's Education Foundation (R), Moodbidri)
Affiliated to Visvesvaraya Technological University, Belagavi & Approved by AICTE, New Delhi.
Recognized by Government of Karnataka.
A+, Accredited by NAAC & NBA (ECE & CSE)
Shobhavana Campus, MIJAR 574225, Moodbidri, D.K., Karnataka
Ph: 08258-262725, Mob:722262724,7026262725,mail:principalaiet08@gmail.com

Department of Agriculture Engineering

Agricultural Process Engineering, Academic Year (2023-24)

II YEAR IVth semester

ADVANCED LEARNERS	
USN No	Name
4AL22AG001	AKSHATA GANGADHAR SUNKAD
4AL22AG002	DEEPAK J
4AL22AG003	DEEPIKA Y
4AL22AG004	ESHA S
4AL22AG005	GURUPRASAD N
4AL22AG006	KASTURI C
4AL22AG007	M B KRUPA
4AL22AG008	N HARIYANTH KUMAR
4AL22AG009	NAVEEN NAYAK
4AL22AG010	NIHAR S ACHARYA
4AL22AG011	NIKITHA
4AL22AG012	NITHIN M SHETTY
4AL22AG013	PRAJNA SHREE JAIN
4AL22AG014	PRANJAL P POOJARY
4AL22AG015	PRAPTHI N S
4AL22AG016	PUNEETH
4AL22AG017	RAJITH S SHETTY
4AL22AG019	SAMANSH Y SUVARNA
4AL22AG020	SUMA M G
4AL22AG021	THEJAS A V
4AL22AG022	THRUPTHI S RAI
4AL22AG023	VEERESH S METI
4AL22AG024	VISHWANATH D CHAVADANNAVAR
Faculty signature	

USN | | | | | | | | | |

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

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ALVA'S
Education Foundation

Department of Agriculture Engineering

Continuous Internal Evaluation Test-1 AY 2023-24

Course Title : **AGRICULTURAL PROCESS ENGINEERING**		Course Code: **BAG403**
Date: 03/06/2024	Time: 3:00 P.M – 04:30 P.M	Semester/Section: IVth
Faculty: **Dr. K. RAJU YADAV**		Max. Marks: 30

Note: Answer ONE FULL question from each Module.

Q. No.		Questions	Marks	COs	BTL
		Module 1			
1	a)	Explain about structure of wheat grain with a neat sketch	3	CO1	L2
	b)	Draw the flow chart of Rheology	6	CO1	L1
	c)	Derive the Kelvin model	6	CO1	L4
		OR			
2	a)	Write about the physical properties of food grains	4	CO1	L2
	b)	Derive the Maxwell model	7	CO1	L4
	c)	Explain briefly about types of Newtonian and Non Newtonian fluids	4	CO1	L1
		Module 3			
3	a)	Explain about Types of screens	8	CO3	L2
	b)	Derive equation for the effectiveness of screen	7	CO3	L4
		OR			
4	a)	Derive the equation of the cyclone separator and explain about working principle with a neat sketch	8	CO3	L4
	b)	**Problem : A cyclone separator having the following specifications is used to collect particles of specific gravity 1.2.** **Cyclone diameter = 180 *cm*** **Air inlet diameter = 30 *cm*** **Separating height = 2.5 of dia. of inlet** **Helix pitch = 15°** **Inlet width = 10 *cm*** **Entry particle velocity = 15 *m/s*** **Compute the smallest particle which can be collected. Estimate the pressure drop through the unit.**	7	CO3	L4

Levels of Bloom's Taxonomy

No.	L1	L2	L3	L4	L5	L6
Level	Remember	Understand	Apply	Analyze	Evaluate	Create

CO1	Be proficient in the scope of the process engineering and the use of processing machinery
CO2	Understand the physical properties, rheological properties and frictional properties of agricultural materials

FACULTY   **IQAC MEMBER**   **IQAC CHAIRMAN**

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Dept. of Agricultural Engineering
Alva's Institute of Engg. & Technology
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Department of Agriculture Engineering

Continuous Internal Evaluation Test-1 AY 2023-24

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Education Foundation

<table>
<tr><td colspan="2">Course Title : AGRICULTURAL PROCESS ENGINEERING</td><td>Course Code: BAG403</td></tr>
<tr><td>Date: 03/06/2024</td><td>Time: 3:00 P.M – 04:30 P.M</td><td>Semester/Section: IV</td></tr>
<tr><td colspan="2">Faculty: Dr. K. RAJU YADAV</td><td>Max. Marks: 30</td></tr>
</table>

CIET-2 SCHEME AND SOLUTION

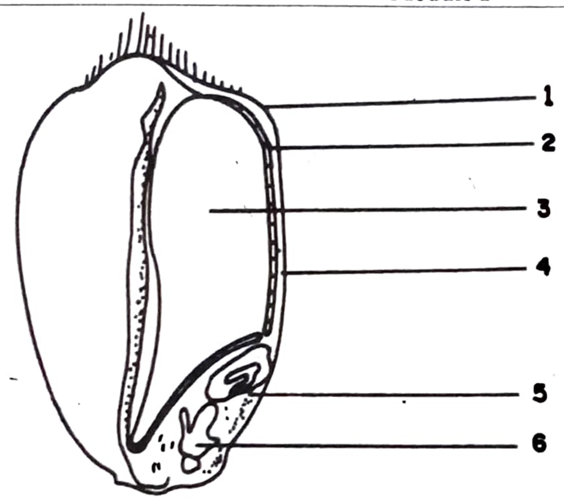
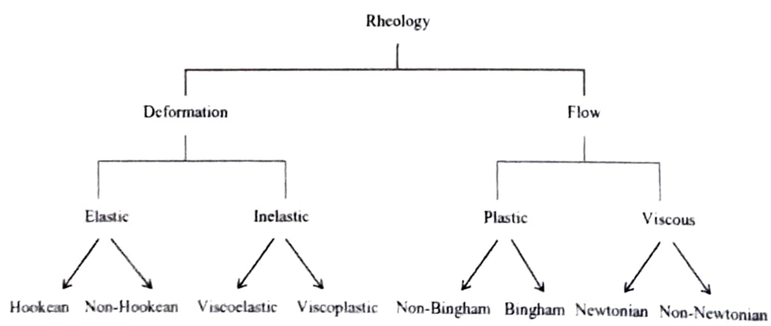
<table>
<tr><th colspan="2">Q. No.</th><th>Questions</th><th>Marks</th><th>COs</th><th>BTL</th></tr>
<tr><td colspan="6">Module 1</td></tr>
<tr><td>1</td><td>a)</td><td>

Fig. 1.1 : Structure of wheat grain
1. pericarp 2. aleurone layer 3. endosperm 4. seed coat 5. plumule 6. radicle</td><td>3</td><td>CO1</td><td>L2</td></tr>
<tr><td></td><td>b)</td><td>
</td><td>4</td><td>CO1</td><td>L1</td></tr>
</table>

			Marks	CO	Level
	c)	**Example 3: Kelvin Model.** You will derive in your homework that the equation for the Kelvin Model is: $\sigma + \frac{\eta}{E_S}\frac{d\sigma}{dt} = E_p\epsilon + \eta\left(\frac{E_p + E_S}{E_S}\right)\frac{d\epsilon}{dt}$	6	CO1	L4
		OR			
2	a)	Write about the physical properties of food grains	4	CO1	L2
	b)	Rearrange to get stress and strain on opposite sides to get the Maxwell model equation: $\sigma + \frac{\eta}{E}\frac{d\sigma}{dt} = \eta\frac{d\epsilon}{dt}$	5	CO1	L4
	c)	**Newtonian & Non-Newtonian fluids** • It has been found that the Shear stress for flow of fluid is directly proportional to the velocity gradient (velocity/distance). $\tau \alpha \frac{du}{dy}$ • Introduce the proportionality constant "viscosity".. μ we get "Newton's law of viscosity" $\tau = \mu\frac{du}{dy}$ • A fluid obeys this law is Newtonian fluid....(i.e. constant viscosity) • -----otherwise Non-Newtonian fluid	4	CO1	L1
		Module 3			
3	a)	**Types of screens** In most screens the grain/seed drops through the screen opening by gravity. Coarse grains drop quickly and easily through large opening in a stationary surface. With finer particles, the screening surface must be agitated in some way. The common ways are, (1) revolving a cylindrical screen about a horizontal axis and (2) shaking, gyrating or vibrating the flat screens.	5	CO3	L2

b)

The total quantity of feed is the sum of overflow and underflow

$$F = O + U$$

$$Fm_f = Om_0 + Um_u \quad ...2.2$$

Substituting $O = F - U$

and $U = F - O$

$$\frac{O}{F} = \frac{m_f - m_u}{m_o - m_u} \quad ...2.3$$

and

$$\frac{U}{F} = \frac{m_o - m_f}{m_o - m_u} \quad ...2.4$$

A common measure of screen effectiveness is the ratio of actual amount of oversize material in the overflow to the amount of oversize material entering with the feed.

Thus, $$E_o = \frac{Om_o}{Fm_f} \quad ...2.5$$

and $$E_u = \frac{U(1 - m_u)}{F(1 - m_f)} \quad ...2.6$$

Overall effectiveness $E = E_o \times E_u$

$$= \frac{OUm_o\ (1 - m_u)}{F^2 m_f\ (1 - m_f)} \quad ...2.7$$

Substituting the values of $\frac{O}{F}$ and $\frac{U}{F}$

$$E = \frac{(m_f - m_u)(m_o - m_f)\, m_o (1 - m_u)}{(m_o - m_u)^2\ (1 - m_f)\, m_f} \quad ...2.8$$

7 | CO3 | L4

OR

4 a)

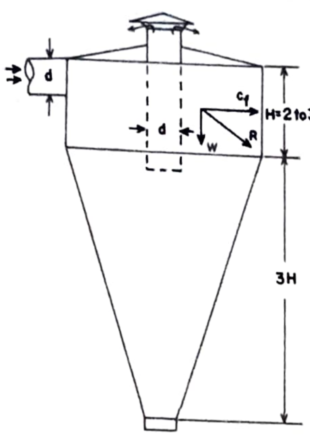


Fig. 2.26 : Cyclone separator

V = linear or tangential velocity, m/s

The separating force can be given as follows:

$$F = W\sqrt{\frac{V^2}{g^2 R^2} + 1} \quad ...2.11$$

The performance or separation factor of cyclone can be given by the following equation:

$$\text{Performance factor, } S = \frac{c_f}{W} = \frac{V^2}{gR} \quad ...2.12$$

It has been found that as 'S' increases the separation becomes more effective.

Problem : Air carrying particles of density 1200 kg/m^3 and an average diameter of 25 *micron* enters a cyclone of 600 *mm* diameter at linear velocity of 20 m/s. Calculate the centrifugal force acting radially in the cyclone and the separation factor of the cyclone.

5 | CO3 | L4

b)

Problem : A cyclone separator having the following specifications is used to collect particles of specific gravity 1.2.

Cyclone diameter = 180 *cm*
Air inlet diameter = 30 *cm*
Separating height = 2.5 of dia. of inlet
Helix pitch = 15°
Inlet width = 10 *cm*
Entry particle velocity = 15 *m/s*

Compute the smallest particle which can be collected. Estimate the pressure drop through the unit. (ARS 1985)

Solution : The pressure drop through the cyclone is estimated by the following equation assuming $K = 0.5$.

$$dp = \frac{12\, W\, h}{K\, E^2 \left(\frac{L}{d}\right)^{1/3} \left(\frac{H}{d}\right)^{1/3}}$$

$$= \frac{12 \times 0.1 \times 0.54}{0.5 \times 0.3 \times 0.3 \left(\frac{0.75}{1.8}\right)^{1/3} \left(\frac{1.8}{1.8}\right)^{1/3}}$$

The entry height was calculated at the centre line of cyclone considering 15° helix pitch

$$dp = \frac{0.648}{0.0336}$$

$$= 19.27.$$

The smallest particle size removed by the unit can be estimated by the following equation.

$$D_p = \sqrt{\frac{9\mu E}{2\pi N V (\rho_p - \rho_a)\left(\frac{4R}{E}\right)^{t}}}$$

$$= \sqrt{\frac{9 \times 5 \times 10^{-5} \times 0.3}{2 \times 3.1416 \times 2 \times 15\,(1200 - 1.293)\left(\frac{4 \times 0.9}{0.3}\right)^{0.5}}}$$

μ = viscosity of air = 5×10^{-5} *kg/m–s*
ρ_a = density of air = 1.293 *kg/m*^{3}

$$Dp = \sqrt{\frac{13.5 \times 10^{-5}}{7.817 \times 10^{5}}}$$

$$= 1.314 \times 10^{-5}\ m$$

$$= 13.14 \times 10^{-3}\ \text{mm or 13 microns}$$

7	CO3	L4

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Continuous Internal Evaluation Test-1 AY 2023-24

Course Title : **AGRICULTURAL PROCESS ENGINEERING**		Course Code: **BAG403**
Date: 09/07/2024	Time: 3:00 P.M – 04:30 P.M	Semester/Section: IV[th]
Faculty: **Dr. K. RAJU YADAV**		Max. Marks: 30

Note: Answer ONE FULL question from each Module.

Q. No.		Questions	Marks	COs	BTL
		Module - 3			
1	a)	During the evaluation of air screen grain cleaner with two screen the followings were observed i. The impurities present in feed were 6.5% ii. The impurities present in clean grain were 0.5% iii. The outflow of blower contained 0.2% clean seed iv. The overflow of the first screen contained 1% clean seed v. The underflow contained 0.5% clean seed Compute the cleaning efficiency of the cleaner	5	CO4	L3
	b)	Explain about rotary screen cleaner and pneumatic separator	5	CO4	L2
	c)	Explain about Magnetic separator with neat sketch	5	CO4	L2
		OR			
2	a)	Explain about colour separator with neat sketch	5	CO4	L2
	b)	Explain about Ideal and Actual screen with neat sketch	5	CO4	L2
	c)	Design consideration of an air screen grain cleaner	5	CO4	L1
		Module - 5			
3	a)	Explain about the modern rice milling plant with flow chart	8	CO5	L2
	b)	Write a flowchart for dry & wet milling of pulses	7	CO5	L1
		OR			
4	a)	What is condensation? Explain about parboiling steps	6	CO5	L1
	b)	Differentiate between hydraulic and screw press with neat sketch	9	CO5	L4

Levels of Bloom's Taxonomy

No.	L1	L2	L3	L4	L5	L6
Level	Remember	Understand	Apply	Analyze	Evaluate	Create

CO4	Some of the basic concepts related to cleaning and size reduction equipment's
CO5	To acquaint the students with the milling of rice, parboiling technologies and milling of pulses and oil seeds

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Department of Agriculture Engineering

Continuous Internal Evaluation Test-2,AY 2023-24

Course Title : **AGRICULTURAL PROCESS ENGINEERING**		Course Code: BAG403
Date: 09/07/2024	Time: 3:00 PM- 04.30AM	Semester/Section: IV
Faculty: Dr. K. RAJU YADAV		Max. Marks: 30

Continuous Internal Evaluation Test- 2 solution

Q. No.		Questions	Marks	COs	BTL
		Module 3			
1	a)	3. i) fraction of clean seed in feed $= 100 - 6.5 = 93.5$ or 0.935 ii) fraction of clean seed in clean grain outlet $= 100 - 0.5 = 99.5$ or 0.995 iii) fraction of clean seed in foreign matter outlets $= \frac{0.2}{100} + \frac{1}{100} + \frac{0.5}{100}$ $= 0.002 + 0.01 + 0.005$ $= 0.017$ Then $E = 0.0995$, $F = 0.935$ and $G = 0.017$ Therefore, Cleaning efficiency $= \frac{E(F-G)(E-F)(1-G)}{F(E-G)^2(1-F)}$ $= \frac{0.995(0.935-0.017)(0.995-0.935)(1-0.017)}{0.935(0.995-0.017)^2(1-0.935)}$ $= 91.18\%$ 4. i) Fraction of clean seed at clean seed out let, $E = \frac{246.5}{250.0} = 0.986$ ii) Fraction of clean seed in feed $F = \frac{231.25}{250.0} = 0.925$ iv) Fraction of clean seed in-foreign matter outlets $G = \frac{1.25}{250.0} + \frac{4.5}{250.0} + \frac{2.0}{250.0} = 0.031$ Therefore, Cleaning efficiency $= \frac{E(F-G)(E-F)(1-G)}{F(E-G)^2(1-F)}$ $= \frac{0.986(0.925-0.031)(0.986-0.925)(1-0.031)}{0.925(0.986-0.031)^2(1-0.925)}$ $= 82.34\%$	5	CO4	L3
	b)	Rotary screen cleaner: The rotary screen cleaner has normally circular decks. Their motion is circular in horizontal plane. These have either single or double drum. A single drum rotary screen cleaner is shown in Figure 3.3. The machine consists of a rotary screen, aspirator and hopper and equipped with an electric motor, which gives drive to the rotary screen and the aspirator. The mixture is fed into the hopper. The sound grains pass through the screen perforation into the centre of the screen drum, whereas oversized material is retained above and	5	CO4	L2

pass out though an outlet. The sound grains come out at the centre side of the screen drum rotating at low speed and fall onto the vibratory screen which remove the dirt particles. The light particles like straw and dust are sucked away by the aspirator and discharged through the aspirator outlet. The cleaned grains are delivered through the discharge chute.

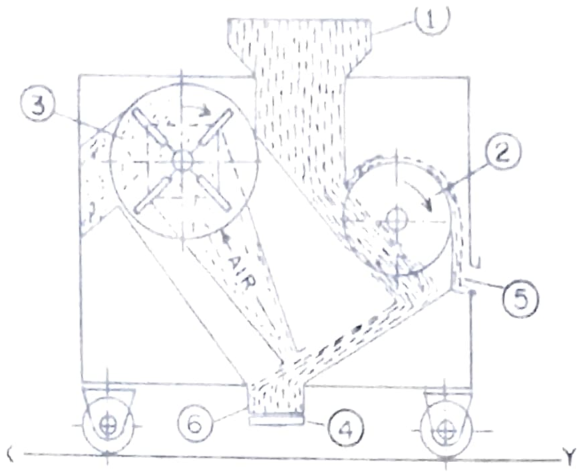


Figure 3.3: Diagram of a single drum rotary screen cleaner. 1) Feed hopper, 2) Rotary screen, 3) Aspirator, 4) Discharge chute, 5) Over size foreign matter outlet, 6) Vibratory screen

c) The magnetic separator separates seed according to its surface texture or related seed characteristics.

First, seed is treated with iron filings, which adhere to rough surface alone.

The treated seed lot is passed over a revolving magnetic drum and separated from smooth, uncoated seed.

It may help to add varied amounts of water while mixing seed and powder, depending on the seed type.

At any rate , the effectiveness of magnetic separation depends on the components of the seed lot and on the powder and water used in the treating operation.

The greater the difference between surface textures of the seed lot's components, more effective will be the separation.

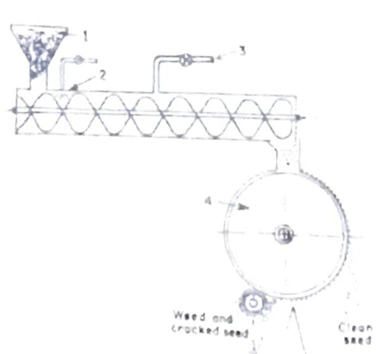
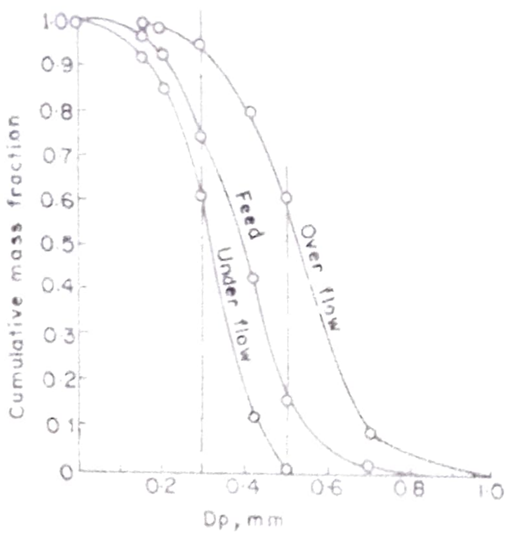
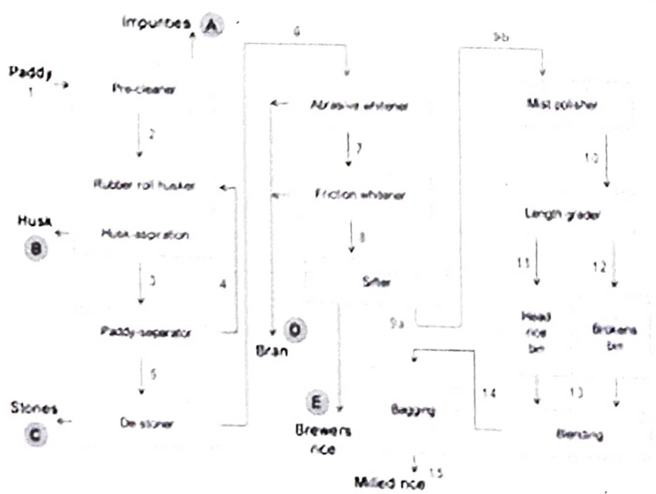


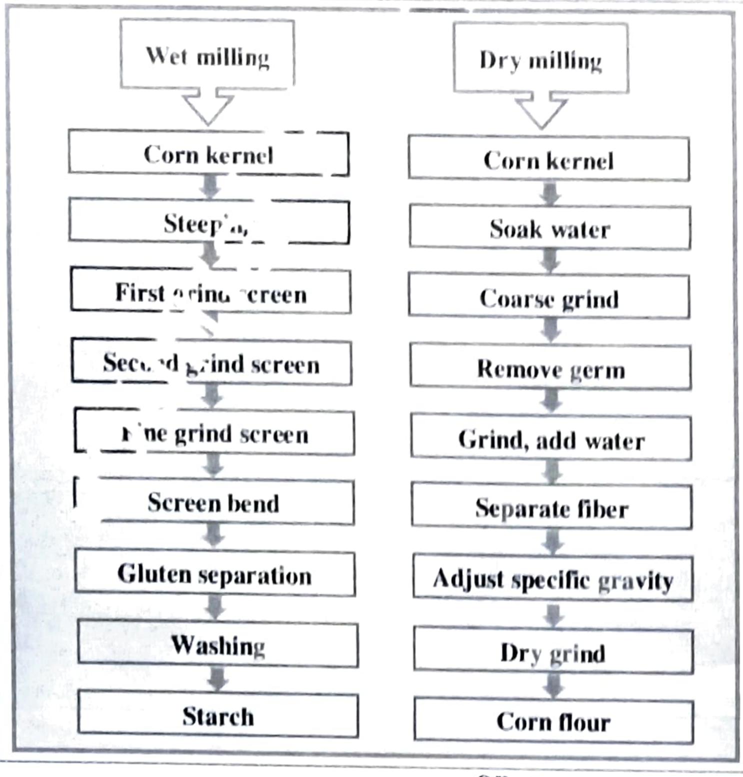
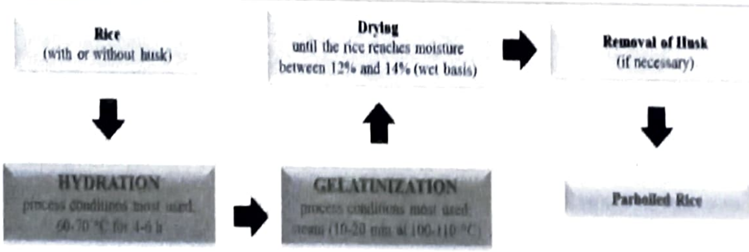
Figure 3.8: Magnetic Separator. 1) Feed hopper, 2) Water spray, 3) Iron powder mixing, 4) Magnetic drum.

5	CO4	L2

OR

2	a)	The colour separator is used to separate discoloured seed, greatly of lower quality. Separation based on colour is necessary because the density and dimensions of discoloured seed are the same as those of sound seed, so other machines are not effective for separation. Electronic colour separation uses photocells to compare the seed colour with "background" which are selected to reflect the same light as the good seed. Seed that differs in colour is detected by the photo cells, which generate an electric impulse. The impulse activates an air jet to blow away the discoloured seed.	5	CO4	L2
	b)	The basic purpose of any screen is to separate a mixture of particles / items of different sizes into two distinct fractions. These fractions are, (1) the - underflow, the particles that pass through the screen, and (2) the overflow oversize, the materials that are retained over the screen. A screen can be termed as ideal screen that separates the mixture in such a way that the largest particle of underflow is just smaller than screen opening, while the smallest particle of overflow is just larger than the screen opening. But in practice a given screen does not gives perfect separation as stated above, and is called actual screen. The underflow may contain material coarser than screen size, whereas the overflow may contain particles smaller than screen size as shown in Figure 3.10.  **re 3.10: Graphical representation of various flows of a screen**	5	CO4	L2
	c)	Properties of Grains: Weight and Size: Different grains have varying weights and sizes, which affect the design of the screens and the airflow required. Moisture Content: The moisture content of the grains can influence the cleaning process, as wetter grains may require different handling compared to dry grains1. Screen Design:	5	CO4	L1

		Perforation Size: The size of the perforations in the screens must be appropriate for the specific type of grain being cleaned to ensure effective separation of debris. Screen Angle and Movement: The angle at which the screens are set and their movement (vibration or oscillation) are crucial for efficient cleaning2. Airflow System: Blower Capacity: The blower must be powerful enough to create the necessary airflow to separate lighter chaff and debris from the grains. Airflow Adjustment: The ability to adjust the airflow is important to cater to different types of grains and varying levels of impurities1. Ease of Operation: User-Friendly Design: The machine should be easy to operate and maintain, with accessible controls and clear instructions. Safety Features: Incorporating safety features to protect the operator from moving parts and dust is essential1. Material Selection: Durability: The materials used in construction should be durable and resistant to wear and tear, especially for parts in contact with grains and debris. Corrosion Resistance: Using materials that resist corrosion will extend the lifespan of the machine1. Power Source: Variable Speed Motor: A motor with variable speed settings allows for adjustments based on the type of grain and the desired cleaning efficiency1.			
		Module 5			
3	a)		8	CO5	L2

	b)		7	CO5	L1
		OR			
4	a)		6	CO5	L1
	b)	Operates based on Pascal's law, which states that pressure applied to a confined fluid is transmitted equally in all directions. Uses hydraulic fluid (usually oil) to generate force. Consists of a hydraulic pump, cylinder, piston, and control valves. The hydraulic pump pressurizes the fluid, which then moves the piston to exert force on the workpiece. Operates on the principle of mechanical pressure. Uses a rotating screw or auger to compress materials. The screw pushes the material into a chamber, increasing pressure as the chamber's volume decreases.	9	CO5	L4

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Continuous Internal Evaluation Test-3 AY 2023-24

Course Title : AGRICULTURAL PROCESS ENGINEERING		Course Code: BAG403
Date: 26/07/2024	Time: 3:00 P.M – 04:30 P.M	Semester/Section: IVth
Faculty: Dr. K. RAJU YADAV		Max. Marks: 30

Note: Answer ONE FULL question from each Module.

Q. No.		Questions	Marks	COs	BTL
		Module 4			
1	a)	Explain about size reduction procedure	3	CO5	L2
	b)	Explain about jaw crusher and ball mill with eat sketch	6	CO5	L2
	c)	Derive the equation for crushing efficiency or energy requirement	6	CO5	L3
		OR			
2	a)	Explain about gyratory crusher and hammer mill with a neat sketch	6	CO4	L2
	b)	Write short note on Ratzinger's law, Kick's law and Bond's law	4	CO4	L1
	c)	**Problem : In a wheat milling experiment it was found that to grind 4.33 mm sized grains to IS sieve 35 (0.351 mm opening), the power requirement was 8 KW. Calculate the power requirement for milling of wheat by the same mill to IS sieve 15 (0.157 mm opening) using (1) Rittinger's law and (2) Kick's law. Feed rate of milling is 200 kg/hr.**	5	CO4	L3
		Module 2			
3	a)	Derive the equation for the drag coefficient	7	CO6	L2
	b)	Write about frictional properties	8	CO6	L1
		OR			
4	a)	Derive the equation for terminal velocity	7	CO6	L2
	b)	write about thermal properties	8	CO6	L1

Levels of Bloom's Taxonomy

No.	L1	L2	L3	L4	L5	L6
Level	Remember	Understand	Apply	Analyze	Evaluate	Create

CO4	Some of the basic concepts related to cleaning and size reduction equipments
CO5	To acquaint the students with the milling of rice, parboiling technologies and milling of pulses and oil seeds
CO6	Understand the filtration equipments

Dey 25/7/24
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Note: Answer ONE FULL question from each Module.

Q. No.		Questions	Marks	COs	BTL
		Module 4			
1	a)	**Size reduction procedures** The size of agricultural products may be reduced by several ways, but mainly the following four methods are used in size reduction machines, (1) compression or crushing, (2) impact, (3) shearing, and (4) cutting. *Crushing* : When an external force applied on a material excess of its strength, the material fails because of its rupture in many directions. The particles produced after crushing are irregular in shape and size. The type of material and method of force application affects the characteristics of new surfaces and particles. Food grain flour, grits and meal, ground feed for livestock are made by crushing process. Crushing is also used to extract oil from oilseeds and juice from sugarcane. *Impact* : When a material is subjected to sudden blow of force in excess of its strength, it fails, like cracking of nut with the help of a hammer. Operation of hammer mill is an example of dynamic force application by impact method. *Shearing* : It is a process of size reduction which combines cutting and crushing. The shearing units consist of a knife and a bar. If the edge of knife or shearing edge is thin enough and sharp, the size reduction process nears to that of cutting, whereas a thick and dull shearing edge performs like a crusher. In a good shearing unit the knife is usually thick enough to overcome the shock resulting from material hitting. In an ideal shearing unit the clearance between the bar and the knife should be as small as practicable and the knife as sharp and thin as possible. *Cutting* : In this method, size reduction is accomplished by forcing a sharp and thin knife through the material. In the process minimum deformation and rupture of the material results and the new surface created is more or less undamaged. An ideal cutting device is a knife of excellent sharpness and it should be as thin as practicable. The size of vegetables and fruits are reduced by cutting.	3	CO5	L2

b)

Crushers : These type of reducing machines squeez or press the material until it breaks. Crushers are mostly used to break large pieces of solid materials into small lumps. Crushers are used in industrial operations, like mines etc. Use of crushers in agricultural operations is limited. The crushers in use are, (1) jaw crushers, (2) gyratory crushers, and (3) crushing rolls.

Lime and other stones are first reduced by the jaw or gyratory crushers. In a jaw crusher feed is admitted between two jaws, which are open at the top like 'V', One of the jaws is fixed and somewhat vertical (Fig 5.4) while the other is the swinging jaw. This jaw reciprocates in a horizontal plane, and makes and angle of

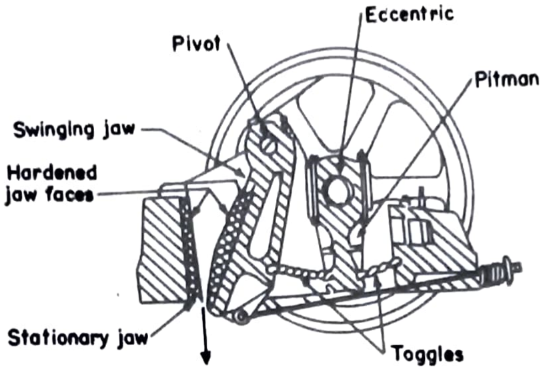

Fig. 5.4 : Jaw crusher

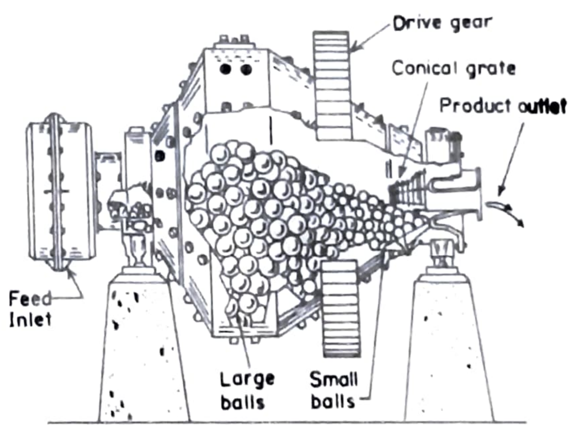

Fig. 5.10 : Ball mill

6 | CO5 | L2

c)

Crushing efficiency

The ratio of the surface energy created by crushing to the energy absorbed by the solid is referred as crushing efficiency 'η_c'

Energy requirements

The energy absorbed by a unit mass of the material is given by the following equation.

$$E_a = \frac{e\,(A_p - A_f)}{\eta_c} \qquad ...5.14$$

where, e = surface energy per unit area

A_p = area per unit mass of product

A_f = area per unit mass of feed

The input energy (E) requirement for size reducing machine is greater than the energy absorbed by the solid (E_a). Some part of the input energy is used to overcome friction in the moving parts and bearings of machine, rest is used for crushing. The ratio of the energy absorbed to the input energy is known as the mechanical efficiency 'η_m'.

Then $$E = \frac{E_a}{\eta_m} = \frac{e\,(A_p - A_f)}{\eta_m\,\eta_c} \qquad ...5.15$$

The power required by the machine can be calculated by the following equation.

$$P = E \times f = \frac{f e\,(A_p - A_f)}{\eta_m \eta_c}$$

Marks	CO	Level
6	CO5	L3

OR

2 a)

Hammer mills : Hammer mills are used for various types of size reduction jobs. These mills contain a high-speed rotor, rotating inside a cylindrical casing. The shaft is usually kept horizontal. Materials are fed into the mill from the top of the casing and is broken by the rotating hammers and fall out through a screen at the bottom. The material or feed is broken by fixed or swinging hammers which are pinned to a rotor. The hammers are rotated between 1500 to 4000 rpm, strike and grind the material until it becomes small enough to pass through the bottom screen (Fig. 5.9). Fineness of grinding is controlled by the screen size.

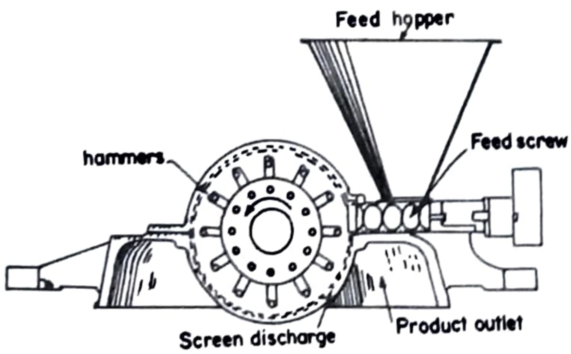

Fig. 5.9 : Hammer mill

Marks	CO	Level
6	CO4	L2

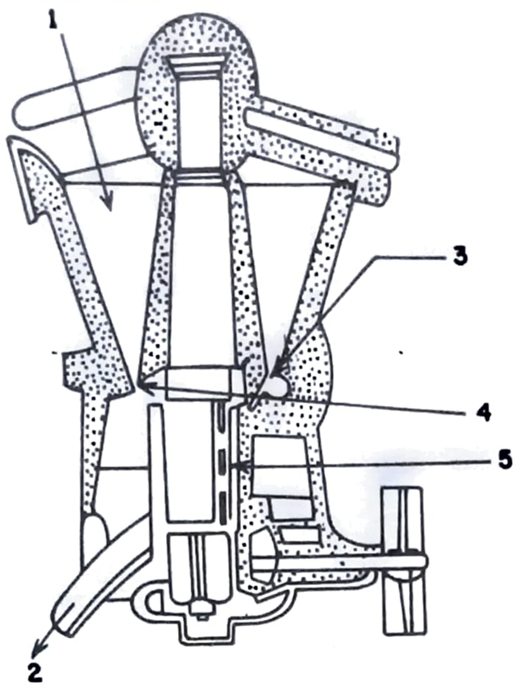

Fig. 5.5 : Gyratory crusher
1. feed 2. discharge 3. maximum opening 4. minimum opening 5. eccentric unit

b)	*Rittinger's and Kick's laws* : A crushing law proposed by Rittinger states that the work required in crushing is proportional to the new surface created. Rittinger assumed that size reduction is essentially a shearing procedure. Therefore, energy requirement is proportional to the square of the common linear dimension and thus the values of '*n*' becomes 2. The energy requirement is given by the following equation $$E = c\left(\frac{1}{X_p} - \frac{1}{X_f}\right) \quad \text{...5.17}$$ where, X_p and X_f = length of product and feed, respectively. Kick proposed another law which based on stress analysis of plastic deformation within the elastic limit. He assumed that the energy requirements for size reduction is a function of a common dimension of the material, therefore, the value of '*n*' becomes 1, and the energy requirements can be given by the following equation 230 *Unit Operations of Agricultural Processing* $$E = c \ln\left(\frac{X_f}{X_p}\right) \quad \text{...5.18}$$ Kick's law can also be expressed as within the elastic limit the work required for crushing a given quantity of material is constant for the same reduction ratio irrespective of the original sizes. The reduction ratio of crushers is often expressed as the ratio of the feed opening to the discharge opening. These openings determine the maximum diameters of feed and product. To be more informative it is necessary to specify the size distribution of feed. and product. *Bond's law* : Bond reported a method for estimating the power required for crushing and grinding operation. According to this law the work required to form particles of size 'D_p' from very large feed is proportional to the square root of the surface-to-volume ratio of the product Since, $\frac{S_p}{v_p} = \frac{6}{\phi D_p}$ $$\frac{P}{f} = \frac{K}{\sqrt{D_p}} \quad \text{...5.19}$$	4	CO4	L1

c)

Solution : (i) According to Rittinger's law

$$\frac{P}{f} = c\left(\frac{1}{X_p} - \frac{1}{X_f}\right)$$

$$\frac{8}{0.2} = c\left(\frac{1}{0.351} - \frac{1}{4.33}\right)$$

$$40 = c\,(2.618)$$

or, $c = 15.278$

By putting the value of 'c' for second condition

Milling

$$\frac{P}{0.2} = 15.278\left(\frac{1}{0.157} - \frac{1}{4.33}\right)$$

or, $P = 18.75$ kw

(ii) According to Kick's law

$$E = c\,ln\left(\frac{X_f}{X_p}\right)$$

or, $$\frac{P}{f} = c\,ln\left(\frac{X_f}{X_p}\right)$$

$$\frac{8}{0.2} = c\,ln\left(\frac{4.33}{0.351}\right)$$

$$40 = c \times 2.5125$$

or, $C = 15.92$

Putting the value of 'c' for second condition

$$\frac{P}{0.2} = 15.92\left(\frac{4.33}{0.157}\right)$$

or, $P = 10.56$ kW

5 | CO4 | L3

Module 2

3 a) **Drag coefficient**

of mass density, ρ_f, viscosity η, and modulus of elasticity, E, with a velocity, V then;

$$F_V = f_1\,(A_p, \rho_f, \eta, E, V) \quad ...1.1$$

and $$F_H = f_2\,(A_p, \rho_f, \eta, E, V) \quad ...1.2$$

Using dimensional analysis technique, the drag and lift forces are:

$$F_V = C_V\,A_p\frac{\rho_f V^2}{2} \quad ...1.3$$

and $$F_H = C_H\,A_p\frac{\rho_f V^2}{2} \quad ...1.4$$

The C_V and C_H are drag and lift coefficient of the material respectively.

The resultant force F_R can be given as;

$$F_R = C\,A_p\frac{\rho_f V^2}{2} \quad ...1.5$$

Where, F_R = resistance drag force or weight of particle at terminal velocity, kg

C = Overall drag coefficient

ρ_f = mass density of fluid, $\frac{Kg\,s^2}{m^4}$

A_P = projected area of the particle normal to direction of motion, m^2

V = relative velocity between main body of fluid and material, m/s

7 | CO6 | L2

b) **Frictional properties**

8 | CO6 | L1

Static friction : The friction may be defined as the frictional forces acting between surfaces of contact at rest with respect to each other.

Kinetic friction : It may be defined as the friction forces existing between the surfaces in relative motion.

If F is the force of friction, and W is the force normal to the surface of contact, then the coefficient of friction 'f' is given by the relationship

$$f = \frac{F}{W}$$

The coefficient of friction may also be given as the tangent of the angle of the inclined surface upon which the friction force tangential to the surface and the component of the weight normal to the surfaces are acting.

Rolling resistance : If a round or cylindrical shaped object rolls over a horizontal surface with force, F, and the deformation in surface occurs, there will be a resultant force, R, exerted by the surface on the body as shown in Fig. 1.10. If the moment of forces is taken about point of application of R and the accelerating force is neglected, then

OR

4 a) Terminal velocity

Terminal velocity

The terminal velocity of a particle may be defined as equal to the air velocity at which a particle remains in suspended state in a vertical pipe. In the condition of free fall, the particle attains a constant terminal velocity, V_t, the net gravitational accelerating force, F_g, equals the resisting upward drag force, F_r.

If $V = V_t$, $F_g = F_r$

By substituting the values of F_g and F_r the terminal velocity can be expressed as;

$$m_p g \left[\frac{(\rho_p - \rho_f)}{\rho_p}\right] = 1/2\, C A_p \rho_f V_t^2 \qquad ...1.6$$

$$\therefore \quad V_t = \left[\frac{2W(\rho_p - \rho_f)}{\rho_p \rho_f A_p C}\right]^{1/2} \qquad ...1.7$$

and

$$C = \frac{2W(\rho_p - \rho_f)}{V_t^2 A_p \rho_p \rho_f} \qquad ...1.8$$

Where, V_t = terminal velocity, m/s

C = overall drag coefficient

g = acceleration due to gravity, m/s^2

m_p = mass of the particle, kg

ρ_p = mass density of particle, $\frac{kgs^2}{m^4}$

ρ_f = mass density of fluid, $\frac{kgs^2}{m^4}$

Marks	CO	Level
7	CO6	L2

b) Thermal properties

Information of thermal properties of products leads towards prediction of heat transfer rate for the product. For design of heating and refrigeration system for food materials, information on following thermal properties are necessary.

1. specific heat
2. thermal conductivity
3. enthalpy
4. thermal diffusion
5. surface heat transfer coefficient

Marks	CO	Level
8	CO6	L1

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ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

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Department of Agriculture Engineering

Continuous Internal Evaluation Practical Exam-1 AY 2023-24

ALVA'S Education Foundation

Course Title : **AGRICULTURAL PROCESS ENGINEERING**		Course Code: **BAG403**
Date: 03/08/2024	Time: 11:00 P.M – 01:00 P.M	Semester/Section: IVth
Faculty: **Dr. K. RAJU YADAV**		Max. Marks: 50

Note: Answer any FOUR questions.

Q. No.		Questions	Marks
1	a)	Explain about size reduction procedure	10 M
	b)	Derive the equation for power requirement for size reduction	
2	a)	Write short note on Rittinger's law, Kick's law and Bond's law	10 M
	b)	**Problem : In a wheat milling experiment it was found that to grind 4.33 mm sized grains to IS sieve 35 (0.351 mm opening), the power requirement was 8 KW. Calculate the power requirement for milling of wheat by the same mill to IS sieve 15 (0.157 mm opening) using (1) Rittinger's law and (2) Kick's law. Feed rate of milling is 200 kg/hr.**	
3	a)	Explain about hammer mill with neat sketch	10 M
	b)	Write about working principle of pneumatic separation with neat sketch	
4		Draw the flow chart for any food processing industry and explain about it	10 M
5	a)	Explain about cyclone separator with neat sketch	10 M
	b)	Air carrying particles of density 1200kg/m^3 and an average diameter of 25 micron enters a cyclone of 600 mm diameter at linear velocity of 20 m/s. Calculate the centrifugal force acting radially in the cyclone and the separation factor of the cyclone.	
6	a)	100 kg grain by drying has brought down from 18 to 13% for milling. Calculate the amount of water removed in drying.	10 M
	b)	In a mixture of fruit juices Δx value is given as 2, Δmix value as 5, Δseg value is 8 find the mixing index.	
7		**Viva- voce**	10 M

3/8/24

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Shobhavana Campus, MIJAR-574225, Moodbidri, D.K., Karnataka
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ALVA'S
Education Foundation

Department of Agriculture Engineering

Assignment Number:	1,2,3	Max Marks:	10 Marks
Subject Name:	Agricultural Process Engineering	Subject Code:	BAG403
Faculty Incharge:	Dr. K. Raju Yadav	Date of Announcement:	10/06/2024 05/07/2024 15/07/2024
Sem /Branch/Section:	IV[th] Agriculture Engineering	Date of Submission:	18/06/2024 12/07/2024 22/07/2024
Max Mark	10	Module Number	1,2,3,4&5

Q. No	Questions	Marks	COs mapped
1	Describe about physical and physiological properties of fruits and vegetable grains.	10	CO1
2	Explain Design consideration of an Air Screen Grain Cleaner	10	CO2 & CO3
3	Write about Energy Requirements	10	CO4 & CO5

Reference text books

1. Unit Operations of Agricultural Processing, Sahay KM and Singh KK 1994, Vikas Publishing House Pvt. Ltd., New Delhi
2. Post-Harvest Technology of Cereals, Pulses and oil seeds, Chakraverty A 1988. Oxford and IBH Publishing Co. Ltd., Calcutta.
3. Physical properties of plant & animal materials, N Mohsenin, 1980, Gordon & breach science publications

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Dept. of Agricultural Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodubidire - 574225

CBCS SCHEME

USN 4AL22AG012

BAG403

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2024

Agricultural Process Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1

			M	L	C
Q.1	a.	Explain physical properties of biomaterials in detail.	10	L2	CO2
	b.	What is force – deformation behavior of bio-materials? Explain with neat diagram.	10	L2	CO2

OR

Q.2	a.	Discuss briefly about importance of physical characteristics of different biomaterials.	10	L2	CO2
	b.	Derive an equation for Kelvin model.	10	L2	CO2

Module – 2

Q.3	a.	Write briefly about frictional properties.	10	L2	CO1
	b.	Explain briefly about thermal properties of food grain.	10	L2	CO3

OR

Q.4	a.	Discuss briefly about aerodynamics properties and mention importance of aerodynamic properties.	10	L2	CO3
	b.	Write a short note on electrical properties.	5	L2	CO3
	c.	Explain applications of engineering properties in handling of processing equipments.	5	L2	CO3

Module – 3

Q.5	a.	Mention types of air screen (grain) cleaner and explain any one in detail with neat sketch.	10	L2	CO3
	b.	Discuss in brief about working principle of cyclone separator with neat sketch.	10	L2	CO4

OR

Q.6	a.	Explain in brief about velvet roll separator with neat sketch.	10	L2	CO3
	b.	Describe working principle of pneumatic separator.	5	L2	CO4
	c.	During evaluation of an air screen grain cleaner with two screen 250g samples were collected for analysis of clean seed fraction from different outlets. The data are presented in the following table. Calculate the cleaning efficiency of the cleaner.	5	L4	CO4

Sample fraction	Feed (g)	Cleaning grain outlet (g)	Blower outlet (g)	Oversize outlet (g)	Undersize outlet (g)
Cleaned seed (g)	231.25	246.5	1.25	4.5	2.0
Impurities (g)	18.75	3.5	248.75	245.5	248.0

		Module – 4			
Q.7	a.	Explain briefly about working of hammer mill with neat sketch.	10	L2	CO5
	b.	Write a short note on working of ball mill.	06	L2	CO5
	c.	What would be the critical speed and operating speed of rotation for wet grinding in viscous suspension by a ball mill of 1600mm diameter charged with 75mm balls?	04	L1	CO3
		OR			
Q.8	a.	Define crushing efficiency. Explain Rittinger's and Kick's law.	10	L2	CO5
	b.	In a wheat milling experiment it was found that to grind 4.33mm sized grains to IS sieve 35 [0.351mm opening], the power requirement was 8kW. Calculate the power requirement for milling of wheat by the same mill to IS sieve 15 [0.157mm opening] using: i) Rittinger's law ii) Kick's law. Feed rate of milling is 200Kg/hr.	10	L4	CO5
		Module – 5			
Q.9	a.	What is paddy parboiling? Explain modern methods of parboiling.	10	L2	CO5
	b.	Define rate of filtration? Explain in brief about constant rate filtration and constant pressure filtration.	10	L3	CO5
		OR			
Q.10	a.	Discuss in detail about wet pulse milling method.	10	L2	CO5
	b.	Explain working principle of centrifugal dehusker with neat sketch.	10	L2	CO5

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4th Semester CIE-Consolidated Report (2022 Scheme) 2023-24 EVEN Semester

Department of Agriculture Engineering

Consolidated CIE- Marks and Attendance

SEMESTER: IV | **Attendance Percentage as on:** 07/08/2024

Minimum Attendance of Percentage = 85%

Roll No	USN	Name	BAG401		BAG402		(BAG403)		(BAG405A)		(BBOK407)	
			MARKS	ATT %	MARKS	ATT %	MARKS	ATT %	MARKS	ATT %	MARKS	ATT %
1	4AL22AG001	AKSHATA GANGADHAR SUNKAD	27	92.0	44	88.64	49	91.8	49	90.4	43	100.0
2	4AL22AG002	DEEPAK J	35	95.0	42	93.18	48	89.7	48	92.8	40	93.0
3	4AL22AG003	DEEPIKA Y	31	90.0	37	90.91	44	89.7	47	92.8	39	87.0
4	4AL22AG004	ESHA S	50	88.0	50	93.18	50	97.9	50	100.0	50	93.0
5	4AL22AG005	GURUPRASAD N	34	86.0	44	95.45	50	91.8	48	95.2	39	87.0
6	4AL22AG006	KASTURI C	39	97.0	44	86.36	50	93.8	50	95.2	42	87.0
7	4AL22AG007	M B KRUPA	39	93.0	42	97.73	49	97.9	50	97.6	43	93.0
8	4AL22AG008	N HARIYANTH KUMAR	39	97.0	46	86.36	49	91.8	50	92.8	40	90.4
9	4AL22AG009	NAVEEN NAYAK	39	97.0	48	100.00	50	100.0	49	100.0	40	85.7
10	4AL22AG010	NIHAR S ACHARYA	49	92.0	50	95.45	50	95.9	50	97.6	50	85.7
11	4AL22AG011	NIKITHA	33	85.0	40	97.73	49	95.9	49	90.4	39	100.0
12	4AL22AG012	NITHIN M SHETTY	24	90.0	32	86.36	39	89.7	32	92.8	33	90.4
13	4AL22AG013	PRAJNA SHREE JAIN	50	95.0	50	97.73	50	100.0	50	95.2	50	85.0
14	4AL22AG014	PRANJAL P POOJARY	28	88.0	33	90.91	45	85.7	41	90.4	35	95.2
15	4AL22AG015	PRAPTHI N S	39	92.0	50	90.91	50	93.8	50	90.4	50	90.4
16	4AL22AG016	PUNEETH	43	88.0	45	95.45	45	93.8	47	97.6	38	100.0
17	4AL22AG017	RAJITH S SHETTY	49	95.0	45	100.00	49	100.0	50	100.0	40	100.0
18	4AL22AG019	SAMANSH Y SUVARNA	44	95.0	44	97.73	49	89.7	47	95.2	40	100.0
19	4AL22AG020	SUMA M G	36	92.0	40	86.36	48	89.7	50	95.2	40	85.7
20	4AL22AG021	THEJAS A V	50	93.0	50	93.18	50	100.0	50	100.0	50	100.0
21	4AL22AG022	THRUPTHI S RAI	42	95.0	50	93.18	50	100.0	50	100.0	42	95.2
22	4AL22AG023	VEERESH S METI	24	86.0	34	86.36	39	85.7	38	88.0	37	90.4
23	4AL22AG024	VISHWANATH D CHAVADANNAVAR	27	88.0	37	88.64	46	89.7	45	95.2	40	95.2

IA ANALYSIS REPORT

	BAG401	BAG402	BAG403	BAG405A	BBOK407
NO OF STUDENTS APPEARED	23	23	23	23	23
NO OF STUDENTS ABSENT	0	0	0	0	0
NO OF STUDENTS PASSED	23	23	23	23	23
NO OF STUDENTS FAILED	0	0	0	0	0
PASS PERCENTAGE	100	100	100	100	100
NO OF STUDENTS BETWEEN 0 TO 18 MARKS	0	0	0	0	0
NO OF STUDENTS BETWEEN 19 TO 50	23	23	23	23	23
Staff Signature with Date	VMB	SK	KRY	KRY	TD

CLASS COORDINATOR | HOD | DEAN ACADEMICS | PRINCIPAL

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PRINCIPAL
Alva's Institute of Engg. & Technology,
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DEPARTMENT OF AGRICULTURE ENGINEERING

COs, PEOs, PSOs and COs-POs/PSOs mapping Matrix with justification

SEMESTER-IV

Sub Code: BAG403	Sub Name: Agricultural Process Engineering
Academic Year: 2023-24	Course Teacher: Dr. K. Raju Yadav

COURSE OUTCOMES: After studying this course, students will be able to:

- BAG403.1 Be proficient in the scope of the process engineering and the use of processing machinery
- BAG403.2 Understand the physical properties, rheological properties and frictional properties of agricultural materials
- BAG403.3 Summarizing the thermal properties, electrical properties and the terms related to the machine design aspects
- BAG403.4 Some of the basic concepts related to cleaning, drying and size reduction equipment's
- BAG403.5 To acquaint the students with the milling of rice, parboiling technologies and milling of pulses and oil seeds
- BAG403.6 Understand the material handling and transportation equipment's

CO-PO /CO-PSO MAPPING MATRIX:

CO NUMBERS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
BAG403.1	2						2									
BAG403.2					2	2		2		2					1	2
BAG403.3		2	2	2	2	2	2	2	2		2			2	1	2
BAG403.4	2	2	2	2	2	2	2	2				2	1	1		1
BAG403.5				2						2	2		1	1		
BAG403.6	2	2											1		1	1
AVERAGE	2	2	2	2	2	2	2	2	2	2	2	2	1	1.3	1	1.5

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DEPARTMENT OF AGRICULTURE ENGINEERING

CO-PO /CO-PSO MAPPING MATRIX JUSTIFICATION:

CO NUMBERS	PO/PSO NUMBERS	JUSTIFICATION
BAG403.1	PO1	To Apply the knowledge of mathematics and engineering scope of the process engineering
	PO7	To understand the use of processing machinery
BAG403.2	PO5	To learn physical properties
	PO6	Understand the rheological properties
	PO8	frictional properties of agricultural materials
	PO9	Advanced instrumentation should should need to measure the properties
	PO10	Storage and handling of paddy and food grains
	POS3	To learn applications instrumentation
	POS4	Design of advanced instrumentation
BAG403.3	PO2	To Apply the knowledge of mathematics and engineering fundamentals of electrical properties
	PO3	Identify the existing problems in machines
	PO4	study about frictional properties
	PO5	Learn about design of machinery
	PO6	Applications of electrical properties machinery
	PO7	Advancement of frictional properties machinery
	PO8	Desig of processing agricultural machinery
	PO9	Technology of advanced agricultural processing machinery
	PO11	Application of all aspects of APE machinery
	PSO2	Develop an advanced machinery
	PSO3	Skills needed for application of agricultural processing machinery
	PSO4	Adopt latest technology to advanced tractors
BAG403.4	PO1	To Apply the knowledge of mathematics and engineering cleaning
	PO2	Study of Drying techniques
	PO3	Size reduction process
	PO4	Latest technology about cleaning machinery
	PO5	Application of drying machinery
	PO6	Gyratory & jaw crusher technology