



Integral University, Lucknow

Effective from Session: 2022-23							
Course Code	AE441	Title of the Course	10- weeks Industrial Attachment /Internship (Student READY)	L	T	P	C
Year	IV	Semester	VII	-	-	10	10
Course Objectives	<ol style="list-style-type: none"> 1. To expose the students to industrial environment. 2. To familiarize the students with various Materials, Machines, Processes, Products and their applications along with relevant aspects of shop management. 3. To make the students understand the psychology of the workers and approach towards problems and practices followed in industries. 4. To make the students understand the scope, functions and job responsibility in various departments of an organization. 5. Exposure to various aspects of entrepreneurship during the programme period. 						

Course Outcomes	
CO1	Students will have the knowledge of working environment in the different departments in the industry
CO2	Students will be able to know various Materials, Machines, Processes, Products and their applications along with relevant aspects of shop management.
CO3	Students will have the ability to understand the psychology of the workers and approach towards problems and practices followed in industries.
CO4	Students will be able to know scope, functions and job responsibility in various departments of an organization.
CO5	Students will be able to know various aspects of entrepreneurship.

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO- PSO CO	POs														PSOs						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	1	1	2	2	1	1	2	2	2	2	1	2	2	2	1	2	1	3	2	1
CO2	3	3	3	2	1	1	2	2	2	1	1	3	1	2	2	1	3	2	2	1	2
CO3	2	1	2	2	1	2	2	3	1	2	1	3	2	3	2	2	1	2	1	3	2
CO4	1	2	2	3	1	2	2	3	1	2	1	2	1	3	3	3	2	3	2	2	3
CO5	2	1	1	2	2	1	1	2	2	3	2	2	1	2	1	2	3	1	1	2	1

2- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2022-23							
Course Code	AE442	Title of the Course	10- weeks Experiential Learning On campus (Student READY)	L	T	P	C
Year	IV	Semester	VII	-	-	10	10
Course Objectives	<ol style="list-style-type: none"> 1. To train the students for self-employment and entrepreneurship development. 2. To make the students understand farm machinery technologies available to promote farm mechanization. 3. To make the students understand value addition technologies available locally through soil less agriculture practices. 4. To make the students understand value addition technologies available locally through integration of integrated farming, food safety, agriculture market and good agriculture practices. 5. To promote professional skills and knowledge through hands on experience. 						

Course Outcomes	
CO1	Students will have the ability to develop the self-employment and entrepreneurship.
CO2	Students will be able to know various farm machinery and their management.
CO3	Students can have the ability to understand the soil less agriculture practices.
CO4	Students will be able to know value addition technologies as food safety, agriculture market and good agriculture practices.
CO5	Students will have professional skills and knowledge through hands on experience.

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO- PSO CO																					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	2	1	2	1	1	2	1	1	1	2	1	2	2	1	1	2	2	2	2
CO2	3	3	3	2	1	1	2	2	2	1	1	3	1	2	3	3	1	3	2	2	3
CO3	2	3	2	1	2	1	1	2	1	1	1	3	1	1	2	2	2	1	2	3	1
CO4	2	3	3	2	1	1	1	2	2	1	1	3	1	2	3	2	2	2	2	2	2
CO5	2	1	2	1	2	1	1	2	1	3	2	2	1	2	1	2	3	3	2	2	3

4- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2022-23							
Course Code	AE443	Title of the Course	Skill Development Training-II (Student READY)	L	T	P	C
Year	IV	Semester	VII	-	-	5	5
Course Objectives	<ol style="list-style-type: none"> 1. To provide students the opportunity to test their interest in a particular specialization of agricultural engineering. 2. To develop technical skills in the application of theory to practical training. 3. To enhance ability to improve students creativity, skills and sharing ideas. 4. To make the students understand skills of report writing of training. 5. To build the strength, team work and self-confidence in students career. 						

Course Outcomes	
CO1	Students will have the ability to choose the specialization of their interest.
CO2	Students will be able to know the technical skills.
CO3	Students will be creative and able to share their ideas.
CO4	Students will be able to write a report on skill development training.
CO5	Students will be able to work in a team with confidence.

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO-PSO CO	POs												PSOs								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	2	2	1	2	1	1	2	1	1	1	2	1	1	1	2	1	2	1	2	2
CO2	2	2	3	2	1	1	2	1	2	1	1	3	1	2	3	1	2	3	2	2	3
CO3	1	3	2	1	2	2	1	2	1	1	1	3	1	1	2	1	2	1	2	3	1
CO4	2	2	3	2	1	1	1	2	2	1	1	3	1	2	3	2	2	2	1	2	2
CO5	2	1	2	1	2	2	1	2	2	2	2	2	1	1	1	2	3	3	2	2	3

6- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2022-23							
Course Code	AE444	Title of the Course	Educational Tour (Registration only)	L	T	P	C
Year	IV	Semester	VII	-	-	2	2
Course Objectives	<ol style="list-style-type: none"> 1. To enable students to acquire knowledge about different industries, research institution and knowledge centers of agricultural engineering concerns. 2. To provide knowledge about organizational structure and mode of operation of different institution and industries. 3. To enhance ability of learning by seeing. 4. To develop the communication skills, confidence and competence among the students to interact with the Scientist and other staff of organization. 5. To ability to build the strength, work in a group. 						

Course Outcomes	
CO1	Students will have knowledge about different industries, research institution and knowledge centers of agricultural engineering concerns.
CO2	Students will be able to know about organizational structure and mode of operation of different institution and industries.
CO3	Students will be able to learn after seeing.
CO4	Students will have improved communication skills and good confidence.
CO5	Students will be able to build the strength and working in a group.

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	1	2	1	2	1	1	2	1	1	1	3	1	1	2	1	3	3	1	3	1
CO2	2	2	3	2	1	1	2	1	2	1	1	3	1	2	1	3	1	1	2	1	1
CO3	1	3	2	1	2	2	1	2	1	1	1	3	1	1	2	3	1	2	1	2	2
CO4	1	1	3	2	1	1	1	2	2	1	1	3	1	2	1	1	1	3	1	3	1
CO5	2	1	2	1	2	2	1	2	1	2	1	2	1	1	2	2	1	1	2	1	2

8- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2021-22							
Course Code	AE458	Title of the Course	Mechanics of Tillage and Traction	L	T	P	C
Year	IV	Semester	VIII	2		1	3
Course Objectives	<ol style="list-style-type: none"> 1. To understand the Importance of mechanics of tillage tools. 2. To get knowledge about design of tillage tools. 3. To learn about the soil dynamics and traction prediction equation. 4. To know about the test related to tillage and traction 5. To understand about the concept and application of GIS in soil dynamics. 						

Course Outcomes	
CO1	To Study of the Importance of mechanics of tillage tools.
CO2	Understand about the concept design of tillage tools.
CO3	Study about the soil dynamics and traction prediction equation.
CO4	Understand about the test related to tillage and traction
CO5	Understand about the concept and application of GIS in soil dynamics.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Unit I	Introduction to mechanics of tillage tools, engineering properties of soil, principles and concepts, stress strain relationship, design of tillage tools principles of soil cutting	6	1
2	Unit II	Design equation, force analysis, application of dimensional analysis in soil dynamics and traction prediction equation. Introduction to traction and mechanics, off road traction and mobility.	6	2 & 3
3	Unit III	Traction model, traction improvement, tyre size, tyre lug geometry and their effects, tyre testing, soil compaction and plant growth, variability and application of GIS in soil dynamics.	5	4 & 5

Practical			
Measurement of static and dynamic soil parameters related to tillage, soil parameters related to puddling and floatation, draft for passive rotary and oscillating tools, slip and sinkage under dry and wet soil conditions and load and fuel consumption for different farm operations; Weight transfer and tractor loading including placement and traction aids; Studies on tyres, tracks and treads under different conditions, and soil compaction and number of operations.		32	1, 2, 3 4 & 5

Reference Books:	
Vandenberg and Gill. Tillage and Traction.	
Liljedahl JB and others. Tractor and Power Units.	
Daniel Hill. Fundamentals of Soil Physics.	
Terzaghi K & Peck Ralph B. Soil Mechanics in Engineering Practices.	
e-Learning Source:	
"https://ecourses.icar.gov.in/"	

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
	CO1	3	3	3	1	2	1	1	3	1	1	3	2	1	3	2	2	3	3	2	3
CO2	3	2	3	2	1	1	1	3	1	1	2	3	2	2	3	2	3	3	3	2	3
CO3	3	3	2	1	1	2	1	3	1	1	3	3	1	3	3	2	3	2	3	2	3
CO4	2	3	3	1	2	1	1	3	2	2	2	3	1	3	3	2	3	2	3	1	2
CO5	3	3	3	2	3	2	3	3	2	2	3	1	3	2	2	2	2	3	2	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2021-22							
Course Code	AE464	Title of the Course	Food Quality and Control	L	T	P	C
Year	IV	Semester	VIII	2		1	3
Course Objectives	1. To understand the basic concepts of food science and importance. 2. To get knowledge about sampling, sampling techniques, procedures, statistical quality control and sensory evaluation methods. 3. To learn about the Instrumental method for testing quality of food adulteration and food safety. 4. To know about the hazards and HACCP, sanitation in food industry (SSOP), Food Laws and Regulations in India, and FSSAI. 5. To understand about the food grades and standards BIS, AGMARK, PFA, FPO, ISO 9000, 22000 Series. CAC (Codex Alimentarius Commission), Traceability and Quality Assurance system in a process plant, Bio safety and Bioterrorism						

Course Outcomes	
CO1	To Study of the basic concepts of food science and importance
CO2	Understand about the sampling, sampling techniques, procedures, statistical quality control and sensory evaluation methods.
CO3	Study about the Instrumental method for testing quality of food adulteration and food safety
CO4	Understand about the hazards and HACCP, sanitation in food industry (SSOP), Food Laws and Regulations in India, and FSSAI
CO5	Understand about the concept of food grades and standards BIS, AGMARK, PFA, FPO, ISO 9000, 22000 Series. CAC (Codex Alimentarius Commission), Traceability and Quality Assurance system in a process plant, Bio safety and Bioterrorism..

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Unit I	Basics of Food Science and Food Analysis, Concept, objectives and need of food quality. Measurement of colour, flavour, consistency, viscosity, texture and their relationship with food quality and composition.	7	1
2	Unit II	Sampling; purpose, sampling techniques, sampling procedures for liquid, powdered and granular materials, Quality control, Quality control tools, Statistical quality control, Sensory evaluation methods, panel selection methods.	7	2
3	Unit III	Interpretation of sensory results. Instrumental method for testing quality. Food adulteration and food safety. TQM and TQC, consumer preferences and acceptance, Food Safety Management Systems GAP, GHP, GMP, Hazards and HACCP (Hazard analysis and critical control point), Sanitation in food industry (SSOP).	8	3 & 4
4	Unit IV	Food Laws and Regulations in India, FSSAI, Food grades and standards BIS, AGMARK, PFA, FPO, ISO 9000, 22000 Series. CAC (Codex Alimentarius Commission), Traceability and Quality Assurance system in a process plant, Bio safety and Bioterrorism.	8	5

Practical		Contact Hrs.	Mapped CO
Examination of cereals & pulses from one of go-downs and market shops in relation to FPO and BIS specifications, Detection of adulteration and examination of ghee for various standards of AGMARK & BIS standards, Detection of adulteration and examination of spices for AGMARK and BIS standards, Detection of adulteration and examination of milk and milk products for BIS standards, Detection of adulteration and examination of fruit products such as jams, jellies, marmalades for FPO specification, Visit to quality control laboratory, Case study of statistical process control in food processing industry, Study of registration process and licensing procedure under FSSAI, Study of sampling techniques from food processing establishments, Visit to food processing laboratory and study of records and reports maintained by food processing laboratory.		30	1, 2, 3,4 & 5

Reference Books:	
Ranganna S. Hand book of Analysis and Quality Control for Fruit and Vegetable Products.	
Srilakshmi B, Food Science.	
Sharma Avanthi. A text book of Food Science and Technology.	
Mudambi Sumati R, Rao Shalini M and Rajagopal M.V. Food Science.	
Potter NN and Hotchkiss JH, Food Science.	
Dev Raj, Rakesh Sharma and Joshi V.K, Quality for Value Addition in Food Processing.	
The Food Safety and Standards Act along with Rules & Regulations. Commercial Law Publishers (India) Pvt. Ltd.	
e-Learning Source:	
“ https://ecourses.icar.gov.in/ ”	

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																						
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	
CO1	3	3	3	1	1	1	1	3	1	1	3	2	1	2	3	2	2	3	3	3	1	
CO2	3	3	3	1	1	1	1	3	1	1	2	3	1	3	3	2	3	3	3	2	3	
CO3	3	3	2	1	1	1	1	3	1	1	2	3	1	3	3	2	3	1	3	2	3	
CO4	3	3	3	1	1	1	1	3	2	2	3	3	1	3	3	3	3	2	3	3	2	
CO5	2	3	3	1	3	1	3	3	2	3	3	1	3	2	2	3	2	3	3	3	2	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation



Integral University, Lucknow

Effective from Session: 2021-22							
Course Code	AE470	Title of the Course	Waste and By-Products Utilization	L	T	P	C
Year	IV	Semester	VIII	2		1	3
Course Objectives	<ol style="list-style-type: none"> 1. To understand the Importance of by-products from agriculture and its importance. 2. To get knowledge about Concept, scope and maintenance of waste management and effluent treatment. 3. To learn about the Waste utilization in various industries. 4. To know about the biomass and its utilization and importance. 5. To understand about the concept of advanced waste water treatment 						

Course Outcomes	
CO1	To Study of the Importance of by-products from agriculture and its importance
CO2	Understand about the concept about Concept, scope and maintenance of waste management and effluent treatment
CO3	Study about the Waste utilization in various industries
CO4	Understand about the biomass and its utilization and importance
CO5	Understand about the concept of advanced waste water treatment.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Unit I	Types and formation of by-products and waste; Magnitude of waste generation in different food processing industries; Uses of different agricultural by-products from rice mill, sugarcane industry, oil mill etc., Concept, scope and maintenance of waste management and effluent treatment	5	1
2	Unit II	Temperature, pH, Oxygen demands (BOD, COD), fat, oil and grease content, metal content, forms of phosphorous and sulphur in waste waters, microbiology of waste, other ingredients like insecticide, pesticides and fungicides residues, Waste utilization in various industries, furnaces and boilers run on agricultural wastes and byproducts,	6	2
3	Unit III	Briquetting of biomass as fuel, production of charcoal briquette, generation of electricity using surplus biomass, producer gas generation and utilization, Waste treatment and disposal, design, construction, operation and management of institutional community and family size biogas plants, concept of vermin-composting	7	3
4	Unit IV	Pre-treatment of waste: sedimentation, coagulation, flocculation and floatation, Secondary treatments: Biological and chemical oxygen demand for different food plant waste– trickling filters, oxidation ditches, activated sludge process, rotating biological contractors, lagoons	6	4
5	Unit V	Tertiary treatments: Advanced waste water treatment process-sand, coal and activated carbon filters , phosphorous, sulphur, nitrogen and heavy metals removal, Assessment, treatment and disposal of solid waste; and biogas generation, Effluent treatment plants, Environmental performance of food industry to comply with ISO-14001 standards	6	5

Practical				
Determination of temperature, pH, turbidity solids content, BOD and COD of waste water, Determination of ash content of agricultural wastes and determination of un-burnt carbon in ash, Study about briquetting of agricultural residues, Estimation of excess air for better combustion of briquettes, Study of extraction of oil from rice bran, Study on bioconversion of agricultural wastes, Recovery of germ and germ oil from by-products of cereals, Visit to various industries using waste and food by-products.			32	1, 2, 3, 4 & 5

Reference Books:
Markel, I.A. 1981. Managing Livestock Waste, AVI Publishing Co.
Pantastico, ECB. 1975. Post Harvest Physiology, Handling and utilization of Tropical and Sub-tropical fruits and vegetables, AVI Pub. Co. y Shewfelt, R.L. and Prussi, S.E. 1992. Post-Harvest Handling – A Systems approach, Academic Press Inc.
USDA. 1992. Agricultural Waste Management Field Hand book. USDA, Washington DC. y Weichmann J. 1987. Post Harvest Physiology of vegetables, Marcel and Dekker Verlag.
V.K. Joshi & S.K. Sharma. Food Processing Waste Management: Treatment & Utilization. New India Publishing Agency.

e-Learning Source:
" https://ecourses.icar.gov.in/ "

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																					
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	1	2	2	2	3	2	2	3	3	2	2	3	3	3	2	3	3	1
CO2	2	3	3	2	1	2	1	2	2	1	2	3	2	2	3	2	3	3	2	2	3
CO3	3	3	2	1	1	3	2	3	1	2	3	2	2	2	3	3	2	3	2	2	2
CO4	3	2	3	1	2	1	1	2	3	3	2	3	1	3	2	3	2	3	3	1	3
CO5	3	2	3	2	3	3	3	2	2	2	3	3	2	3	3	2	2	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation