Syllabus For Oilseeds and their By-products Processor

Course Name	Oilseeds and their By-products Processor
Sector	Agriculture
Course Code	AGR/2024/OBPP/373
Level	3
Occupation	Oilseeds and their By-products Processor/ Oil mill operator/Production Assistance
Job Description	Oilseeds and By-products Processor is responsible for overseeing the processing of oilseeds and their by-products, ensuring efficient production and high-quality output. This role involves operating and maintaining processing equipment, performing tasks such as cleaning, dehulling, storage of oilseeds and extracting oils from various seeds. They will also involved in the production of value-added products, managing by-products for alternative uses.
Course Duration	**Total Duration 390 Hrs (T-90, P-180, OJT-60 and ES-60)**
Trainees' Entry Qualification	Grade 10 OR Grade 8 pass and pursuing continuous schooling in regular school with vocational subject OR 8th grade pass with 2 yrs relevant experience OR 5th grade pass with 5 years relevant experience 0R Previous relevant Qualification of NSQF Level 2 with one yr experience OR Previous relevant Qualification of NSQF Level 2.5 with 6 months experience
Trainers Qualification	B.E./B. Tech in Agricultural Engineering with 1 year experience in the relevant field OR Diploma in Agricultural Engineering with 2 year experience in the relevant field

Structure of Course:

Module No.	Module name	Outcome	Compulsory/ Elective	Theory (Hrs)	Practical (Hrs)	OJT (Hrs.)	Total (Hrs) [Multiple of 30]
1	**Introduction to oil and oilseeds**	Explain the physical properties of different oilseeds	Compulsory	20	10		30
2	**Handling and storage of oilseeds**	Exhibit the procedure of handling and storage of oilseeds	Compulsory	20	40		60

Module No.	Module name	Outcome	Compulsory/ Elective	Theory (Hrs)	Practical (Hrs)	OJT (Hrs.)	Total (Hrs) [Multiple of 30]
3	**Oil milling process and Solvent extraction process**	Demonstrate the procedure of oil milling and solvent extraction process	Compulsory	20	40		60
4	**Packaging and storage of edible oils**	Explain the requirement of packaging and storage of edible oils	Compulsory	10	50		60
5	**Production of value added products**	Demonstrate the preparation of value added product and by product of oil seeds	Compulsory	10	20		30
6	**Hygiene and cleanliness**	Maintain personal hygiene, cleanliness and safety at the workplace.	Compulsory	10	20		30
7	**OJT**	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	Compulsory	-	-	60	60
8	**Employability Skill**	As per guided curriculum	Compulsory	60	-		60
		TOTAL		**150**	**180**	**60**	**390**

SYLLABUS:

Module No. 1: Introduction to oil and oilseeds

Outcome: Explain the physical properties of different oilseeds

Theory Content:

- Introduction to different oils &oilseeds; Oil content of different oilseeds;
- Physical and chemical properties of various oils and their domestic / industrial uses;
- Quality of oil – different standards; Rancidity of oils & its prevention; Aflatoxin in oil bearing materials

Practical Content:

- Determination of physical properties of different oilseeds Determination of moisture and oil contents of oilseeds
- Proximate analyses of different oilseeds
- Determination of specific gravity, colour, viscosity, etc. of oils
- Determination of acid, iodine and saponification values

Module No. 2: Handling and storage of oilseeds

Outcome: Exhibit the procedure of handling and storage of oilseeds

Theory Content:

- Handling and storage of oilseeds;Dehulling of oilseed;
- Size reductionand pretreatment of oilseeds for oil extraction;
- Mechanical oil expression - principles of operation of *ghani*, rotary, hydraulic press and screw expeller;
- Purification of oil – gravity settling, filter press;

Practical Content:

- Study of dehulling, size reduction and pretreatment equipment for oilseeds
- Mechanical expression of oil fromlaboratory model equipment Study of oil extraction in *ghani*,rotary, hydraulic press and screwexpellers and calculation of extraction efficiency.
- Study offilter press; Maintenance of oil milling equipment

Module No. 3: Oil milling process and Solvent extraction process

Outcome: Demonstrate the procedure of oil milling and solvent extraction process

Theory Content:

- Oil milling process in commonoilseeds – groundnut, mustard,sesame, coconut, sunflower, safflower and cotton seed; Oil extraction process in palm oil Extraction processes of virgincoconut oil.
- Solvent extraction process - stepsinvolved, batch and continuous- continuous solvent extraction processes. Recovery of solvent from miscella; Removal and recovery of solvent from oil cake; Solvent extraction of oils from rice bran, soybean, etc.
- Refining of oil – objectives; Dewaxing and degumming processes; Types of refining - continuous acid refining- bleaching of oils - continuous bleaching process; De-colourising anddeodorization processes.

Practical Content:

- Visit to different commercial oil milling establishments to study oil extraction in - *ghani*, rotary, hydraulic press and screwexpellers and calculation of extraction efficiency
- Laboratory oil extraction in Soxhlet apparatus with different solvents
- Study of solvent extraction technique of edible oil in pilot scale unit
- Visit to commercial solventextraction plant
- Refining of different types of oilusing convention methods Refining of oil in the pilot model oil refining unit,
- Visit to oil refining Unit

Module No. 4: Packaging and storage of edible oils

Outcome: Explain the requirement of packaging and storage of edible oils

Theory Content:

- Packaging and storage of edible oils
- requirements; Types of packages – rigid and flexible packages, tin, glass, Polyethylene

Terephthalate(PET), Poly Vinyl Chloride and LDPE pouches; Chemical changes during storage of oil; Labeling ofoil packages- statutory requirements

- Industrial applications of oils - quality regulations, FSSAI, ISI and Agmark standards; Manufacture of
- soap, candle, paints and varnishes;
- Site and equipment selection foredibleoil extraction plant; Production management andmarketing of edible oil and by- products; Cost analysis

Practical Content:

- Demonstrate tin filling and seaming of oils
- Demonstrate auto form fill sealmachines for pouch filling of oil Studies on storage of oil withdifferent packaging materials
- Procedure of chemical testing ofstored oils
- Visit to Soap, candle, paints andvarnishes manufacturing units

Module No. 5: Production of value added products

Outcome: Demonstrate the preparation of value added product and by product of oil seeds

Theory Content:

- Production of value added products; Hydrogenation of edible oils - manufacture of *vanaspati*; Production of peanut butter,
- margarine; Oil seeds as direct edible products
- By-product utilization of oil extraction industry; Oil cakeanalysis; defating of oil meals / cakes; Oil meal/ cake as raw material for animal / poultry feed; Oil cake export
- Site and equipment selection foredibleoil extraction plant;
- Production management andmarketing of edible oil and by- products; Cost analysis

Practical Content:

- Preparation of value added products – peanut butter, fried / roasted seeds and sensory quality analysis;
- Visit to relevant food industries
- Visit to animal and poultry feedmanufacture units
- Mini assignment for preparationof Bankable Project Document for Establishment of Oil Milling Unit

Module No. 6: Hygiene and cleanliness

Outcome: Maintain personal hygiene, cleanliness and safety at theworkplace.

Theory Content:

- Explain the requirements of personal health, hygiene and fitness at work.
- Describe common health-relatedguidelines laid down by the organizations/ Government at the workplace.
- Explain the importance of goodhousekeeping at the workplace.
- Explain the importance of informingthe designated authority on personal health issues related to

injuries and infectious diseases.

Practical Content:

- Demonstrate personal hygienepractices to be followed at the workplace.
- Demonstrate the correct way of washing hands using soap andwater, and alcohol-based hand rubs.
- Demonstrate the steps to follow toput on and take off a mask safely. Show how to sanitize and disinfectone's work area regularly.
- Demonstrate adherence to theworkplace sanitization norms.
- Show how to ensure cleanliness ofthe work area.

Module 7: OJT

Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **60 Hours.**)

Module 8: Employability Skills **(60 Hrs)**

Key Learning Outcomes

Introduction to Employability Skills Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone

9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration:5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely

19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

Learning Outcome – Assessment Criteria

Module No.	Outcome	Assessment Criteria
1	Explain the physical properties of different oilseeds	**After completion of this module students will be able to:** 1.1 Identify and name different oils and oilseeds, showcasing a foundational understanding of their variety and types 1.2 Explain the oil content of various oilseeds, providing information on the percentage of oil present. 1.3 Provide the physical and chemical properties of different oils and their applications in domestic and industrial settings. 1.4 Explain the importance of adhering to quality standards, the causes of rancidity, and preventive measures against rancidity and aflatoxin contamination. 1.5 Perform the necessary procedures to determine the moisture and oil contents of given oilseeds accurately. 1.6 Demonstrate the proximate analyses of different oilseeds, highlighting the percentage of components like moisture, protein, fat, etc. 1.7 Carry out the procedures for determining specific gravity, colour, viscosity, and other relevant properties of oils. 1.8 Perform the necessary steps to determine acid, iodine and saponification values of oils.
2	Exhibit the procedure of handling and storage of oilseeds	**After completion of this module students will be able to:** 2.1 I explain the processes and principles involved in the dehulling of oilseeds. 2.2 Identify proper handling and storage practices for oilseeds. 2.3 Provide practical examples or scenarios demonstrating the size reduction and pretreatment processes for oilseeds. 2.4 Explain the scientific principles behind size

Module No.	Outcome	Assessment Criteria
		reduction and pretreatment and their significance in oil extraction. 2.5 Identify and name different mechanical oil expression methods and understand their basic principles. 2.6 Explain the principles of operation for ghani, rotary, hydraulic press, and screw expeller, highlighting their unique features. 2.7 Identify different methods of oil purification, including gravity settling and the use of a filter press. 2.8 Demonstrate the operation of ghani, rotary, hydraulic press, and screw expellers, and accurately calculate extraction efficiency.
3	Demonstrate the procedure of oil milling and solvent extraction process	**After completion of this module students will be able to:** 3.1 Explain the key steps and considerations in the oil milling process for various common oilseeds. 3.2 Demonstrate extraction processes for palm oil and virgin coconut oil, outlining the steps involved and any unique characteristics. 3.3 Describe the steps involved in both batch and continuous solvent extraction processes. 3.4 Explain the objectives of refining, including processes such as dewaxing and degumming. 3.5 Perform laboratory-scale oil extraction using a Soxhlet apparatus, demonstrating practical skills and understanding of the solvent extraction technique. 3.6 Demonstrate the refining of different types of oil using conventional methods in a laboratory setting, showcasing practical skills in oil refining. 3.7 Describe the refining of oil in a pilot model oil refining unit, showcasing an understanding of the industrial-scale refining process.
4	Explain the requirement of packaging and storage of edible oils	**After completion of this module students will be able to:** 4.1 Identify and list the requirements for packaging and storage of edible oils. 4.2 Explain the chemical changes that may occur during the storage of oil and understand the statutory requirements for labeling oil packages 4.3 Describe various types of packaging materials for edible oils. 4.4 List the quality regulations and standards such as FSSAI, ISI, and Agmark applicable to industrial applications of oils. 4.5 Identify the industrial applications of oils in the production of soap, candle, paints, and varnishes. 4.6 Explain the principles of production

Module No.	Outcome	Assessment Criteria
		management and marketing specific to edible oils and their by-products. 4.7 Conduct cost analysis related to the production and marketing of edible oils and by-products. 4.8 Perform chemical testing on stored oils, demonstrating practical skills in assessing the quality of oils over time.
5	Demonstrate the preparation of value added product and by product of oil seeds	**After completion of this module students will be able to:** 5.1 Identify and list the various value-added products produced from edible oils, including vanaspati. 5.2 Identify and name products like peanut butter and margarine produced from edible oils. 5.3 List the by-products generated in the oil extraction industry, with a focus on oil cake. 5.4 Explain the defatting process of oil meals/cakes and how these defatted products serve as raw materials for animal and poultry feed. 5.5 Explain the criteria for selecting a suitable site and equipment for an edible oil extraction plant, considering factors such as logistics, accessibility, and efficiency. 5.6 Perform the practical tasks involved in the preparation of value-added products such as peanut butter and fried/roasted seeds 5.7 Prepare a mini assignment that includes a bankable project document for the establishment of an oil milling unit.
6	Maintain personal hygiene, cleanliness and safety at theworkplace.	**After completion of this module students will be able to:** 6.1 Illustrate the importance of personal health, hygiene, and fitness in the workplace. 6.2 Recognize and list key health-related guidelines commonly mandated by organizations or government authorities. 6.3 Articulate the significance of maintaining a clean and organized work environment, and the impact it has on overall workplace safety and efficiency. 6.4 Exhibit the proper personal hygiene practices that should be followed in a workplace setting. 6.5 Carry out the steps involved in washing hands correctly using both soap and water, and alcohol-based hand rubs. 6.6 Carry out workplace sanitization activities according to established norms and guidelines. 6.7 Explain methods to ensure the cleanliness of the work area, emphasizing specific practices and routines.
7	OJT	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).

Module No.	Outcome	Assessment Criteria
8	Employability Skill	As per guided curriculum

List of Tools, Equipment & materials needed for 30 Trainees (Practical)

S. No.	Description of tools	Qty
1	Soxhlet apparatus	1
2	Ghani	1
3	Power Ghani	1
4	Rotary press	1
5	Hydraulic press	1
6	Screw press	1
7	Expellers	1
8	Filter press	1
9	Pilot model oil Solvent extraction plant	1
10	Pilot model oil Refining Unit	1
11	Centrifuge	1
12	Form fill sealing machine	1
13	Deep fat fryer	1
14	Moisture meter	1
15	Hot air oven	1
16	Oil analyses equipment for – colour, Sp. gravity, pH, turbidity, viscosity	1 set

Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr marks	Total OJT marks
Explain the physical properties of different oilseeds	AGR/0273/OC1	30	80	0
Exhibit the procedure of handling and storage of oilseeds	AGR/0273/OC1	30	120	0
Demonstrate the procedure of oil milling and solvent extraction process	AGR/0273/OC1	30	120	0
Explain the requirement of packaging and storage of edible oils	AGR/0273/OC1	20	150	0
Demonstrate the preparation of value added product and by product of oil seeds	AGR/0273/OC1	20	90	0
Maintain personal hygiene, cleanliness and safety at the workplace.	AGR/0273/OC1	20	90	0
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	AGR/0273/OC1	0	0	150
Employability Skills – 60 Hrs	DGT/VSQ/N0102	50	0	0