**VFP4G11TB – Technology of Cereals, Pulses and Oilseeds**
**(GENERAL COURSE - 11)**
**Semester IV**

**Total Credits: 4**

**Total Lecture Hours: 60 (4 Hours/ Week)**

**Aim of the course:** To acquaint with production and consumption trends, structure, composition, quality evaluation, and processing technologies for product development and value addition of various cereals, pulses and oilseeds.

**Course Overview and Context**

- To create awareness about the processing of major cereals like paddy, maize.
- To study the storage and handling techniques of cereals, oilseed and pulses.
- To gain knowledge on processing and milling of pulses and extraction of oil.

**Content**

| MODULE | CONTENT | LECTURE |
|---|---|---|
| 1 | **Paddy Processing- Composition and Quality characteristics. Curing of Paddy. Parboiling Processessoaking, steaming, drying,Paddy Dryer -LSU Dryer. Production of Flattened Rice and Puffed Rice from Paddy.** | 10 |
| 2 | **Rice Milling- Paddy Dehusking Processes. Rice Mill Flow Chart. Engelberg Huller Mills. Modern Rice Mills – Their Components - Pre Cleaners, rubber roll Shellers, Paddy Separators – Satake type, Extraction of rice bran oil and uses of rice bran in food industry.** | 15 |
| 3 | **Wheat milling-Wheat - composition and nutritional value, wheat milling process – cleaning-conditioning/hydrothermal treatment, milling-break roll and reduction rolls.** | 10 |

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|---|---|---|
| 4 | **Milling of Pulses- Varieties-chemical composition and structure-dry milling and wet milling process of pulses, processed products of pulses.** | 10 |
| 5 | **Oil seed processing- Introduction-methods- hydraulic press- screw press – principle and working, solvent extraction methods, Clarification, degumming, neutralization, bleaching, deodorization techniques/process, blending of oils. Hydrogenation.** | 15 |

**Learning Resources**

**References**

1. Dendy DAV & Dobraszczyk BJ. (2001), "Cereal and Cereal Products", Aspen Publications.
2. Chakraverty, A. (1995), "Post Harvest Technology of Cereals, Pulses and Oilseeds". Oxford and IBH Publishing Co, Calcutta
3. N.L.Kent and A.D.Evans: (1994) "Technology of Cereals" (4th Edition), Elsevier Science (Pergaman), Oxford, UK,
4. Samuel Matz: (1992), "The Chemistry and Technology of Cereals as Food and Feed, Chapman & Hall

**VFP4G12TB – Technology of Beverages**
**(GENERAL COURSE - 12)**
**Semester IV**

**Total Credits: 4**

**Total Lecture Hours: 60 (4 Hours/ Week)**

**Aim of the course:** The aim of the course is to provide the students with general scientific knowledge about processing of alcoholic and non- alcoholic beverages.

**Course Overview and Context**

- To study about the various beverages.
- To study about the products made out of them.
- To provide a technical view of beverages.
- To understand the manufacturing processes in the context of technology.

**Content**

| MODULE | CONTENT | LECTURE |
|---|---|---|
| 1 | **Introduction to beverages- Types of beverages and their importance, status of beverage industry in India, Manufacturing technology for juice-based beverages, technology of still, carbonated, low-calorie and dry beverages, isotonic and sports drinks; role of various ingredients of soft drinks, carbonation of soft drinks.** | 10 |
| 2 | **Manufacturing process of beverages- Beverages based on tea, coffee, cocoa, spices, plant extracts, herbs, nuts, Dairy-based beverages.** | 10 |

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|---|---|---|
| 3 | **Types of coffee and tea- Chemical composition and processing of tea and coffee and their quality assessment. Types of tea: black tea, green tea, oolong tea. Types of coffee: Vaccum coffee, drip coffee, iced coffee, instant coffee. swiss water process, direct and indirect method, triglyceride method, carbon dioxide method.** | **15** |
| 4 | **Alcoholic beverages- Types, manufacture and quality evaluation; the role of yeast in beer and other alcoholic beverages, ale type beer, lager type beer, technology of brewing process, equipments used for brewing and distillation, wine and related beverages, distilled spirits.** | **15** |
| 5 | **Packaged drinking water- Definition, types, manufacturing processes, quality evaluation and raw and processed water, methods of water treatment, BIS quality standards of bottled water; mineral water, carbonated water.** | **10** |

## Learning Resources

### Reference Books

1. Manay, N.S, Shandaksharaswamy, M., (2004), "Foods- Facts and Principles", New Age International Publishers, New Delhi,
2. Potter, N.N, Hotchkiss, J.H.( 2000), "Food Science". CBS Publishers, New Delhi.
3. Srilakshmi, B. Food Science (3rd Edition) (2003), New Age International (p) Limited Publishers, New Delhi,
4. Nicholas Dege. (2011), "Technology of Bottled water". Blackwell publishing Ltd, UK.

**VFP4G13TB – Food Product Design and Development**
**(GENERAL COURSE - 13)**
**Semester IV**

**Total Credits: 4**

**Total Lecture Hours: 60 (4 Hours/ Week)**

**Aim of the course:** To demonstrate a theoretical knowledge of the basic concepts of new food product development, and to understand the process involved in the production of a new product.

**Course Overview and Context**

- To understand the concept of a new product development.
- To understand the processing of a new product.
- To know the knowledge base required for accomplishing a product development.
- To know the ways to introduce a new product in the market.

**Content**

| MODULE | CONTENT | LECTURE |
|---|---|---|
| 1 | **Concept of product development- Need, importance and objectives of formulation for new product development. Product success and failure, factors for success, process of product development, managing for product's success. Innovation strategy - possibilities for innovation, building up strategy, product development programme.** | 12 |
| 2 | **Product development process- Ideas, Formulation based on sources availability and cost competitiveness for concept developments of new products, Product strategy, product design and process development, product launch and evaluation.** | 12 |

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|---|---|---|
| 3 | **Knowledge base for product development technology-Adaptable technology and sustainable technology for standardized formulation for process development. Knowledge and the food system, knowledge management, knowledge for conversion of product concept to new product. Process control parameters and scale up production trials for new product development at lab and pilot scale** | 12 |
| 4 | **Role of consumers in product development-Consumer behaviour, food preferences, avoiding acceptance, integration of consumer needs in product development and sensory needs.** | 12 |
| 5 | **Managing the product development process-Principles of product development management, people in product development management, designing the product development process, key decision points.** | 12 |

## Learning Resources

## References

1. Howard R. Moskowitz, Jacqueline H. Beckley, Anna V. A. Resurreccion, (2012), "Sensory and Consumer Research in Food Product Design and Development", John Wiley & Sons Publishers.
2. Kenneth B. Kahn, (2012), "The PDMA Handbook of New Product Development", John Wiley & Sons Publishers.
3. Jacqueline H. Beckley, M. Michele Foley, Elizabeth J. Topp, Jack C. Huang, Witoon Prinyawiwatkul, (2008), "Accelerating New Food Product Design and Development", John Wiley & Sons Publishers.

**VFP4S10PB – Technology of Cereals, Pulses and Oilseeds (Practical)**
**(SKILL COURSE - 10)**
**Semester IV**

**Total Credits: 6**

**Total Laboratory Hours: 90 (6 Hours/ Week)**

**Course Overview and Context:**
- To understand the physical properties of cereal flours.
- To impart knowledge on working of a rice milling station.
- To impart knowledge on working of a oil expelling unit station.

**Content**

| MODULE | CONTENT | LECTURE |
|---|---|---|
| 1 | Physical characteristics of Wheat | 10 |
| 2 | Estimation of Gluten Content of flour. | 10 |
| 3 | Estimation of Potassium Bromate in flour. | 10 |
| 4 | Physical Characteristics of Rice and paddy | 15 |
| 5 | Cooking characteristics of rice. | 15 |
| 6 | Visit to rice mill station. | 15 |
| 7 | Visit to beverage unit. | 15 |

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**VFP4S11PB – Byproduct utilization and Waste management**
**(SKILL COURSE - 11)**
**Semester IV**

**Total Credits: 6**

**Total Lecture Hours: 90 (6 Hours/ Week)**

**Aim of the course:** To understand about the ways for effective utilisation of the byproducts obtained after food processing and also to gain knowledge about characterisation of waste products and effluent treatment methods.

**Course Overview and Context**

- To identify types of wastes in food industry
- To gain knowledge in different effluent treatment methods
- To utilize the byproduct in the food industry

**Content**

| MODULE | CONTENT | LECTURE |
|---|---|---|
| 1 | **Introduction- Types of waste and magnitude of waste generation in different food processing industries, concept, scope and importance of waste management and effluent treatment.** | 15 |
| 2 | **Waste characterization- Temperature, pH, Oxygen demands (BOD, COD, TOD), fat, oil and grease content, microbiology of waste, other ingredients like insecticide, pesticides and fungicides residues** | 15 |
| 3 | **Effluent Treatment- Pretreatment of waste: sedimentation, coagulation. Secondary treatments: Biological oxidation trickling filters, activated sludge process, industrial waste water treatment: characteristics of industrial wastewater, treatment levels** | 20 |

| | | |
|---|---|---|
| 4 | **Waste utilization of agro industries- Characterization and utilization of byproducts from cereals (breweries), pulses, oilseeds, fruits & vegetables (wineries) and plantation crops (sugar industries).** | **20** |
| 5 | **Waste utilization of animal and marine product industries- Characterization and utilization of byproducts from dairy, eggs, meat, fish and poultry** | **20** |

## Learning Resources

## Reference

1. Abbas Kazmi, Peter Shuttleworth, (2013), "The Economic Utilisation of Food Co-Products", Royal Society of Chemistry Publishing.
2. A.M. Martin, (2012), "Bioconversion of Waste Materials to Industrial Products", Springer Science & Business Media Publishing.
3. Marcos von Sperling,(2007), "Basic Principles of Wastewater Treatment", IWA Publishing.

**VFP4S12PB – Marketing Management**
**(SKILL COURSE - 12)**
**Semester IV**

**Total Credits: 6**

**Total Lecture Hours: 90 (6 Hours/ Week)**

**Course Overview and Context**

 To know about the various types marketing strategy involved in generating sales for a new product food products'

 To have a basic idea about different marketing skills,

 To know the different ways in which a food can be marketed to give optimum visibility,

 To understand the importance of packaging in improving sales and the latest marketing trends

**Content**

| MODULE | CONTENT | LECTURE |
|---|---|---|
| 1 | **Marketing management- Introduction- Definition of marketing and marketing management- Marketing concepts and functions-Marketing research – marketing mix.** | 15 |
| 2 | **Market segmentation- Concept-Need-Basis-Market targeting-Market Positioning -Understanding consumer behaviour- Buying motives- Factors influencing consumer buying decisions** | 15 |
| 3 | **Marketing of products- Product- Meaning-Product development- Product mix- PLC-Branding- brand equity-Brand loyalty-Trade mark. Packaging and labelling - Pricing of products-Factors influencing pricing- Pricing policies and Strategies-Types of pricing.** | 20 |

| | | |
|---|---|---|
| 4 | **Logistic and supply chain management- Its elements-Channel of distribution types- Factors affecting the choice of a channel of distribution.** | **20** |
| 5 | **Emerging trends in marketing- Modern marketing- Direct marketing- E Marketing- Tele marketing-Viral marketing - Relationship marketing-Social marketing- Demarketing.** | **20** |

# Flattened rice

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**Flattened rice poha**

| | |
|---|---|
| **Alternative names** | Chewda (Hindi), atukulu (Telugu), avalakki (Kannada), aval (Tamil, Malayalam), chiura, chuda (Odia), chira (Bengali), sira (Assamese), poha, beaten rice |
| **Region or state** | Indian subcontinent |
| **Main ingredients** | Dehusked rice |

- Cookbook: Flattened rice poha
- Media: Flattened rice poha

**Flattened rice**, commonly known **poha** in Hindi, is rice which is flattened into flat, light, dry flakes originating from the Indian subcontinent. Rice is parboiled before flattening so that poha can be consumed with very little to no cooking. These flakes of rice swell when added to liquid, whether hot or cold, as they absorb water, milk or any other liquids. The thickness of the flakes varies between almost translucently thin (the more expensive varieties) to nearly four times thinner than a normal rice grain. It is also called "beaten rice", not to be confused with *poha*, a Central-West Indian dish prepared using flattened rice as the key ingredient. In particular, Indori poha is famous in Indore and eaten with jalebi.

This easily digestible form of raw rice is very popular across India, Nepal and Bangladesh, and is normally used to prepare snacks or light and easy fast food in a variety of Indian cuisine styles,

some even for long-term consumption of a week or more. It is known by a variety of names: *avalakki* (ಅವಲಕ್ಕಿ) in Kannada, *bajil* (ಬಜಿಲ್) in Tulu, *pauaa/paunva* (પૌઆ) in Gujarati, *poya* in Rajasthani, *chuda* in Odia (ଚୁଡ଼ା) and Maithili , *atukulu* in Telugu (అటుకులు), *aval* in Tamil (அவல்) and *Aval* in Malayalam (അവൽ), *chiura* in parts of Bihar and Jharkhand, *sira* in Assamese (চিৰা) and Sylheti (□□□□), *chira* in Bengali (চিঁড়া), *chiura* (चिउरा/□□□□□) in Nepali, Bhojpuri and Chhattisgarhi, *poha*[1] or *pauwa*[2] in Hindi, *baji* in Newari, *pohe* (पोहे) in Marathi, and *phovu* (फोवूं) in Konkani.[3]


White aval

Poha, a snack made of flattened rice

Cooked poha

*Poha* can be eaten raw by immersing it in plain water or milk, with salt and sugar to taste, or lightly fried in oil with nuts, raisins, cardamoms, and other spices. The lightly fried variety is a standard breakfast in Malwa region (surrounding Ujjain and Indore) of Madhya Pradesh. It can be reconstituted with hot water to make a porridge or paste, depending on the proportion of water added. In villages, particularly in Chhattisgarh, flattened rice is also eaten raw by mixing with jaggery.

In Maharashtra, poha is cooked with lightly fried mustard seeds, turmeric, green chilli, finely chopped onions, and most importantly with fried peanuts and then moistened poha is added to the spicy mix and steamed for a few minutes.