



UNIVERSITI TEKNOLOGI MARA

FST359: INTRODUCTION TO UNIT OPERATIONS

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| Course Name (English) | INTRODUCTION TO UNIT OPERATIONS APPROVED |
| Course Code | FST359 |
| MQF Credit | 4 |
| Course Description | This module covers the principles and applications of unit operations in the food industry. Topics covered are centrifugation, filtration, solvent extraction, mechanical expression, size reduction, mixing, heat transfer, evaporation, cleaning, sorting and grading of foods. |
| Transferable Skills | Resourceful and Responsible |
| Teaching Methodologies | Lectures, Project-based Learning |
| CLO | CLO1 Describe the theory of unit operations in food processing industry. CLO2 Respond to the function and usage of selected equipment used in food processing industry. CLO3 Find solution involving principles and calculations related to unit operations in food industry. |
| Pre-Requisite Courses | No course recommendations |
| Topics | |
| 1. 1) Introduction 1.1) i) Definition of unit operations 1.2) ii) Type of unit operations in the food industry 1.3) iii) Flow diagram and flow sheet 1.4) iv) Conversion factor | |
| 2. 2) Centrifugation 2.1) i) Principle and calculation of centrifugation 2.2) ii) Types of centrifuge 2.3) iii) Application of centrifugation in food industry | |
| 3. 3) Filtration, ultra-filtration and reverse osmosis 3.1) i) Theory, principle and calculation in filtration 3.2) ii) Types of filtration equipment 3.3) iii) Application of filtration in food industry 3.4) iv) Theory and principle in ultra-filtration and reverse osmosis 3.5) v) Ultra-filtration and reverse osmosis equipment | |
| 4. 4) Solvent Extraction and Mechanical Expression 4.1) i) Theory, choice of solvent, pre-treatment of feed 4.2) ii) Types of solvent extraction and mechanical expression equipment 4.3) iii) Calculation on solvent extraction | |
| 5. 5) Size reduction 5.1) i) Principle and application of size reduction 5.2) ii) Grinding, cutting and slicing equipment | |
| 6. 6) Mixing 6.1) i) Measurement of mixing 6.2) ii) Type of mixers 6.3) iii) Emulsification: principle and application | |
| 7. 7) Heat transfer equipment 7.1) i) Theory of heat transfer 7.2) ii) Equipment and applications | |

8. 8) Evaporation

8.1) i) Theory and calculation

8.2) ii) Equipment and applications

9. 9) Basic preparative operations

9.1) i) Cleaning

9.2) ii) Sorting and grading

| Assessment Breakdown | % |
|-----------------------|---------|
| Continuous Assessment | 100.00% |

| Details of Continuous Assessment | Assessment Type | Assessment Description | % of Total Mark | CLO |
|----------------------------------|--------------------|--------------------------------------------------|-----------------|------|
| | Assignment | Producing ONE (1) individual written assignment. | 25% | CLO3 |
| | Final Test | Online Test 2 (Chapter 7, 8 & 9) | 20% | CLO1 |
| | Individual Project | Producing ONE (1) individual video. | 25% | CLO2 |
| | Test | Online Test 1 (Chapter 1 & 2) | 10% | CLO1 |
| | Test | Online Test 2 (Chapter 3 & 4) | 10% | CLO1 |
| | Test | Online Test 2 (Chapter 5 & 6) | 10% | CLO1 |

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| Reading List | <p>Reference Book Resources</p> <ul style="list-style-type: none"> • Singh, R.P., and Heldman, D.R. 2003, <i>Introduction to food Engineering</i>, Academic Press • Fellows. 2000, <i>Food Processing Technology: Principles and Pr</i>, CRC Press • Earle, R.L. 1993, <i>Unit Operations in Food Processing.</i>, 2nd edition Ed., Pergamon Press • Toledo, R.T. 1991, <i>Fundamentals of Food Process Engineering</i>, 2nd edition Ed., Van, Nostrand Reinhold, • Brennan, J.G., Cowell, C., and Lily. 1989, <i>Food Engineering Operations.</i>, 3rd edition Ed., Applied Sci. Pub. Ltd |
| Article/Paper List | This Course does not have any article/paper resources |
| Other References | This Course does not have any other resources |