

ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Home and Health Sciences)

Course: Food Microbiology (7507)
Level: Post Graduate

Semester: Autumn, 2013
Credit Hours: 4(3+1)

CONTENT LIST

Following items are included in the study pack:

1. Course Book (Unit 1–9)
2. Theory Assignment One
3. Practical Assignment One
4. Assignments Forms 06
5. Schedule for submitting the assignments and tutorial meetings

Note: If any one item of the above mentioned content list is missing from your study pack kindly contact:-

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WARNING

1. **PLAGIARISM OR HIRING OF GHOST WRITER(S) FOR SOLVING THE ASSIGNMENT(S) WILL DEBAR THE STUDENT FROM AWARD OF DEGREE/CERTIFICATE, IF FOUND AT ANY STAGE.**
2. **SUBMITTING ASSIGNMENTS BORROWED OR STOLEN FROM OTHER(S) AS ONE'S OWN WILL BE PENALIZED AS DEFINED IN "AIOU PLAGIARISM POLICY".**

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Total Marks: 100

ASSIGNMENT No. 1
(Units 1–7)

Note: Write answers to the following questions.

- Q. 1 Elaborate the following: **(20)**
- i. Selective and Differential Media
 - ii. Hydrophobic grid membrane filter technique
 - iii. Process of wine fermentation
 - iv. Serial Dilution
- Q. 2 Summarize the work of different scientists in reference to food microbiology. **(10)**
- Q. 3 What do you know about microbial growth curve? How intrinsic factors can influence the growth curve. **(10)**
- Q. 4 Discuss the following: **(20)**
- a) Thermal process to prevent botulism
 - b) Work of Esty & Meyer on Botulism outbreaks
- Q. 5 Enlist and explain different enumeration methods used for microbial analysis of a food samples. **(10)**
- Q. 6 Enlist and discuss all the rapid methods used in food microbiology. **(10)**
- Q. 7 Define indicator microbe and enlist its important properties. Also explain sampling plan used in food microbiology. **(10)**
- Q. 8 What do you mean by fermented products and enlist some important dairy

fermented products. Also define starter culture and discuss changes brought by starter culture in fermented dairy products. (10)

ASSIGNMENT No. 2

(PRACTICALS)

Total Marks: 100

Practical No. 1

Introduction to equipment of laboratory, glassware and methods of sterilization. (10)

Practical No. 2

Experiments to show the growth of bacteria - basic techniques. (10)

Practical No. 3

Introduction and practice of methods of streaking. (10)

Practical No. 4

Methods of dilution, inoculation, incubation and total viable count. (10)

Practical No. 5

Introduction and practice of methods of gram staining. (10)

Practical No. 6

Determination of aerobic mesophilic bacteria in water and soft drinks. (10)

Practical No. 7

Determination of coliform bacteria in milk and milk products. (10)

Practical No. 8

Enumeration of yeasts and moulds in milk and milk products. (10)

Practical No. 9

- a) Viva voce examination. (10)
 - b) Submission of practical notebooks. (10)
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COURSE OUTLINES

FOOD MICROBIOLOGY (7507)

Unit 1: INTRODUCTION TO FOOD MICROBIOLOGY

- Introduction
- Food Microbiology, Past and Present
- Future and Beyond

Unit 2: FACTORS THAT INFLUENCE MICROBES IN FOODS

- Food Ecosystems, Homeostasis, and Hurdle Technology
- Classical Microbiology and its Limitations
- Microbial Physiology and Metabolism
- Conclusion

Unit 3: SPORES AND THEIR SIGNIFICANCE

- Spores in the Food Industry
- Spore Biology

- Structure, Macromolecules, Dormancy
- Resistance, Freezing and Desiccation Resistance, pressure Resistance, Radiation Resistance, UV Radiation Resistance, Chemical Resistance, Heat Resistance
- The Cycle of Sporulation and Generation, Sporulation, Activation, Germination, Outgrowth

Unit 4: DETECTION AND ENUMERATION OF MICROBES IN FOOD

- Sample collection and processing Analysis
- Metabolism-Based methods Surface Testing

Unit 5: RAPID AND AUTOMATED MICROBIAL METHODS

- Sample processing
- Requirements and Validation of Rapid methods
- Rapid methods Based on Traditional Methods
- Immunologically Based Methods
- Molecular methods
- Potpourri of Rapid Methods

Unit 6: INDICATOR MICROORGANISMS AND MICROBIOLOGICAL CRITERIA

- The Purpose of Microbiological Criteria
- Establishing Microbiological Criteria
- Indicators of Microbiological Quality
- Indicators of Food Borne Pathogens and Toxins
- Application and Specific Proposals for Microbiological Criteria for Food and Food Ingredients

Unit 7: FERMENTATIVE ORGANISMS

- The Biochemical Foundation of Food Fermentation
- Dairy Fermentations
- Fermented Vegetables
- Meat Fermentations
- Other Fermented Foods

Unit 8: SPOILAGE ORGANISMS

- MEAT, Poultry, and Seafood Products
- Milk and Dairy Products
- Spoilage of Produce and Grains

Unit 9: MOLDS, VIRUSES AND PRIONS

- Introduction
- Isolation, Enumeration and Identification
- Aspergillus Species
- Penicillium Species Viruses
- Virus Biology
- Hepatitis A & E Virus
- Food Relatedness of Other Viruses

Reference Books:

1. *Thomas J. Montaville & Karl R. Mathews Food Microbiology An introduction, 2005 Published by Tayler & Francis group.*

2. *Food Microbiology C-code 868 AIOU, Compiled Material.*