

Semester Wise Syllabus for Postgraduates
Recommended by Home Science Board of Studies
Jiwaji University, Gwalior

M.Sc. (Home Science)
Food and Nutrition

SEMESTER-II
PAPER-I
Advance in Food Microbiology

SS-473
M.B
P.16
M.17

85
M.M. 100

Objectives

1. The course will enable the students to gain deeper knowledge of micro organism in human environment and to understand the importance of microorganism in foods technology.
2. To understand legal aspects in areas.
3. To develop skills in handling food safety.
4. To know the food borne diseases and how to prevent it.

UNIT-I

Introductions to Food Microbiology

1. Historical development of Microbiology and Food Technology Regulations and Standards in Food legislation.
2. **Environmental Microbiology:** Bacteria Mold, fungi, yeast and virus their morphology, cultural characteristics biochemical activities, their sources foods.
3. Factors affecting growth of micro organism in Foods Intrinsic and extrinsic parameter. Conditions that influence microbial growth in food.

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UNIT - II

Estimation and Isolation of Micro Organisms:

1. Historical development of Microbiology and Food Technology Regulation and Standards in food legislation
 - Conventional methods; SPC
 - Immunological Methods: RIA, ELISA, FIA
 - Chemical Method: ATP measurement and PCR (Polymers-Chain Reaction)
 - Rapid methods (new techniques)
2. Microscope colony count. Analysis, DMC (Direct Microscopic Count)
3. Estimation of the number 'O' Microorganisms, MPN (Most Probable Numbers)

UNIT-III

Microbiology of different foods:

1. Major cause of food spoilage, principles of food preservation control of micro organisms: by destruction and by retarding growth. Microbial Intoxication in food groups such as Milk & Milk products cereals, Meat, fish egg. fruits & vegetables cammed foods.
2. Foods, Borue disease: (Bacterial and virus) Signs/Symptoms and prevention
 - Staphylococcal Gastroenteritis
 - Clostridium perfinger
 - Botulinum and Vibro
 - E-coli, Salmonella, Shingellae
 - Poliomyelitis
 - Infectious Hepatitis

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UNIT-IV

Microbiology safety of foods:

1. Indicators of food safety and quality, indicator organisms: methods for detection. Microbiology criteria of various foods products and their significance definition sampling plan.
2. HACCP System, Food safety used in controlling Microbiological Hazards
3. Antimicrobial compounds: Biologically based preservation system, probiotic bacteria.

UNIT-V

Role of Microbes:

Its advantages and disadvantages in food production. Use of microorganism in Dairy products. Meat. Fish. Beverage.

Bread and Idli: Beer, Wine, Yoghurt etc

Apparent health benefits of fermented foods and the role of microbes.

GMF (Genetically Modified Foods)

Definition, use advantages and characteristics of GMF, GM applications, For future by Genetically modified organisms.

References:

1. Topley and Wilsons (1983) Principles of Bacteriology, Virology and Immunity, Edited by S.S. Wilson, A Miles and M.T. Parker, Vol. I: General Microbiology and Immunity, II: Systematic Bacteriology, 7th Edition, Edward Arnold Publisher.
2. Block, J.G. (1999) Microbiology Principles and Explorations, 4th Edition John Wiley and Sone Inc.
3. Frazier, W.C. (1988) Food Microbiology, Mc Graw Hill Inc. 4th Edition.
4. Jay, James, M. (2000) Modern Food Microbiology, 6th Edition, Aspen Publishers, Inc. Maryland.
5. Banwant, G. (1989) Basic Food Microbiology, 2nd Edition CBS Publisher.
6. Garbutt, J. (1997) Essentials of Food Microbiology, 1st Edition, Arnold International Students Edition.
7. Doyle, P. Benchat, L.R. and Mantville, T.J. (1997): Food Microbiology, Fundamentals and Frontiers ASM Press Washington DC.

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8. Adams, M.R. and M.G. Moss (1995): Food Microbiology, 1st Edition, New Age International (P) Ltd.
9. Bensaon, H.J. (1990) Microbiological applications, C Brow.
10. Roday, S. (1999) Food Hygiene and sanitation, 1st Edition. Tata Mc Graw Hill, New Delhi.
11. Venderzant, C. and D.F. splits Toesser (192): Compendium of Methods for the Microbiological Examination of Foods, 3rd Edition, American Public Health Association, Washington DC.

Journals

12. Journal of Food Science Published by the Institute of Food Technologists, Chicago lu. USA.
13. Journal of Food Science and Technology Published by Association of Food Scientists and Technology (India) CFTRI Mysore.
14. Food Technology published by the Institute of Food Technologists, Chicago lu. USA.

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SEMESTER-II
PAPER-II

Applied Biochemistry and Technique

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Objectives

This course will enable students to:

1. Augment this Biochemistry knowledge acquired at the undergraduate level.
2. Understand the mechanisms adopted by the human body for regulation of metabolic pathways.
3. Get an insight into interrelationship between various metabolic pathways.
4. Become proficient for specialization in nutrition.
5. Understand integration of cellular level metabolic events to nutrition disorder and imbalances.
6. Understand the principals of various analytical for nutrition research.
7. Familiarize with the application of the above techniques.

UNIT-I

Vitamin and traces elements in the function of enzymes.
Detoxification in body metabolism of foreign compounds.

UNIT-II

Membrane structure assembly and function.
Hemoglobin and its metabolism

UNIT-III

Basic of instrumentation physio-chemical principals and methodology colorimetry, photometry -
flopurimetry, flame photometry and atomic absorptionmetry.

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