**ANNAMALAI UNIVERSITY**

**(Affiliated Colleges)**

**220 – B. Sc. Nutrition, Food Service Management and Dietetics**

Programme Structure and Scheme of Examination (under CBCS)

(Applicable to the candidates admitted from the academic year 2023 -2024 onwards)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Part | Course Code | Study Components & Course Title | Credit | Hours/Week | Maximum Marks | | |
| CIA | ESE | Total |
|  |  | SEMESTER – I |  |  |  |  |  |
| I | 23UTAML11/  23UHINL11/  23UFREL11 | Language– I  nghJ jkpo; - I  Hindi-I/  French-I | 3 | 6 | 25 | 75 | 100 |
| II | 23UENGL12 | General English – I | 3 | 6 | 25 | 75 | 100 |
| III | 23UNFDC13 | Core – I: Human Physiology (Theory & Practical) | 5 | 5 | 25 | 75 | 100 |
| 23UNFDC14 | Core – II : Basics of Food Microbiology(Theory & Practical) | 5 | 5 | 25 | 75 | 100 |
| 23UNFDE15 | Elective – I: Foundations of Baking and Confectionery | 3 | 4 | 25 | 75 | 100 |
| IV | 23UTAMB16  23UTAMA16 | Skill Enhancement Course-1 (NME-I) /\*  Basic Tamil – I /  Advanced Tamil – I | 2 | 2 | 25 | 75 | 100 |
| 23UNFDF17 | Foundation Course:  Nutrition for the Family | 2 | 2 | 25 | 75 | 100 |
|  |  | Total | 23 | 30 |  |  | 700 |
|  |  | SEMESTER – II |  |  |  |  |  |
| I | 23UTAML21/  23UHINL21/  23UFREL21 | Language– II  பொது தமிழ் -II: தமிழிலக்கிய வரலாறு-2/  Hindi-II  French-II | 3 | 6 | 25 | 75 | 100 |
| II | 23UENCL22 | General English – II | 3 | 6 | 25 | 75 | 100 |
| III | 23UNFDC23 | Core –III: Food Science | 5 | 5 | 25 | 75 | 100 |
| 23UNFDP24 | Core – IV: Basic Cookery Practical | 5 | 5 | 25 | 75 | 100 |
| 23UNFDE25 | Elective – II: Food Product Development | 3 | 4 | 25 | 75 | 100 |
| IV | 23UTAMB26  23UTAMA26 | Skill Enhancement Course – 2 (NME-II) /\*  Basic Tamil – II /  Advanced Tamil - II | 2 | 2 | 25 | 75 | 100 |
| 23USECG27 | Skill Enhancement Course – 3  Internet and its Applications  (Common Paper) | 2 | 2 | 25 | 75 | 100 |
|  |  | Total | 23 | 30 |  |  | 700 |

Non-major (NME) courses offered to other Department

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| IV | 23UNFDN16 | Clinical Nutrition | 2 | 2 | 25 | 75 | 100 |
| 23UNFDN26 | Hospital Food Service Administration | 2 | 2 | 25 | 75 | 100 |

\* PART-IV: NME / Basic Tamil / Advanced Tamil (Any one)

Students who have not studied Tamil upto 12th Standardand have taken any Language other than Tamil in Part-I, must choose Basic Tamil-I in First Semester & Basic Tamil-II in Second Semester.

Students who have studied Tamil upto 10th & 12th Standardand have taken any Language other than Tamil in Part-I, must choose Advanced Tamil-I in First Semester and Advanced Tamil-II in Second Semester.

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| --- | --- | --- |
| SEMESTER: I  PART: III  CORE: I | **23UNFDC13 : HUMAN PHYSIOLOGY**  **(Theory and Practical)** | CREDIT: 5  HOURS: 5/W |

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| **Learning Objectives** |
| To enable the students to : |
| * Gain basic understanding of human anatomy and physiology |
| * Learn the integrated functioning of cells, tissues, organs and systems. |
| * Apply the principles of nutrition and dietetics on the basis of thorough understanding of human physiology. |

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| --- | --- | --- |
| **UNIT** | **CONTENT** | **HOURS** |
| **I** | **Cell and tissues -** Structure of Cell and functions of different of different organelles. Classification, structure and functions of tissues.  **Blood-** Constituents of blood- RBC, WBC and Platelets and its functions. Erythropoiesis, Blood clotting, Blood groups and histocompatibility  **Immune system-** Antigen, Antibody, Cellular and Humoral Immunity  ( in brief) | **12** |
| **Practical**  Microscopic study of different tissues: epithelial, connective, muscular and nervous tissue  Blood Experiments- Blood Smear, Blood Count and Blood Grouping | **6** |
| **II** | **Nervous system**  General anatomy of nervous system, functions of the different parts  **Sense organs**  Structure and functions of Eye, Ear, Skin. Physiology of Taste and Smell-in Brief, | **12** |
| **Practical**  Study of the Structure of Brain using model/ specimen and structure of Eye and Ear using models/charts | **2** |
| **III** | **Heart and circulation**  Anatomy of the heart and blood vessels, properties of cardiac muscle, origin and conduction of heartbeat, cardiac cycle, cardiac output, blood pressure - definition and factors affecting blood pressure, and description of ECG.  **Respiratory system**  Anatomy and physiology of respiratory organs. Gaseous exchange in the lungs and tissues, Mechanism of respiration. | **10** |
| **Practical**  Recording of Blood Pressure  Study of the structure of Heart Lung using specimen, model/ charts/ videos | **5** |
| **IV** | **Digestive system**  Anatomy of Gastro-intestinal tract, Structure and functions of Liver and Pancreas. Digestion and absorption of carbohydrates, proteins and fats. **Excretory system**  Structure of kidney, functions of Nephron | **12** |
| **Practical**  Study of the Structure of Liver, Pancreas, Stomach using model /charts  /specimen/ videos | **2** |
| **V** | **Endocrine system**  Functions of hormones secreted by Pancreas, Pituitary gland, thyroid, parathyroid and adrenal glands. Effects of hypo and hyper secretion of these glands.  **Reproductive system**  Anatomy of male and female reproductive organs, Ovarian and Uterine cycle, influence of hormones on pregnancy and lactation. | **12** |
| **Practical**  Microscopic study of tissues of the Pituitary, Thyroid, Ovary and Testis Study of the structure of the male and female reproductive organs using models/charts/videos | **2** |
|  | **TOTAL** | **75** |

# COURSE OUTCOMES

**After successful completion of the course the student will be able to:**

**CO1.** Describe the structure and functions of a cell, various tissues, primary organs and systems in the body.

**CO2.** Explain the interrelationship between systems for maintenance of equilibrium.

**CO3**. Evaluate the role of the nervous and endocrine system in regulating the activities of other systems.

**CO4**. Identify the microscopic structure of basic tissues, label the parts of primary physiological systems in the body such as nervous, respiratory, digestive, endocrine and reproductive systems.

**CO5.** Perform haematological study of blood such as blood smear, blood count and blood grouping, record pulse, blood pressure and interpret a normal ECG.

# Reference:

1. Beck, W.S. (1971) Human Design. Harcourt Brace Jovanovich Inc., New York.
2. Best, C. H. and Taylor, N. B. (1980) Living Body. 4th ed. BIP, Bombay.
3. Creager, J. G. (1992) Human Anatomy and Physiology. 2nd ed. WMC Brown Publishers, England.
4. Guyton, A.C. (1979) Physiology of the Human Body. 5th ed. Saunders College of Publishing, Philadelphia.
5. Subramaniam, S. and Madhavan Kutty, K. (1971) The Text Book of Physiology. Orient Longman Ltd., Madras.
6. Tortora G. J.Anagnostakos N.P. (1984). Principles of Anatomy and Physiology, 4th edition, Harper and Row Publishers, New York.
7. Waugh A and Grant A. (2012) Ross and Wilson Anatomy and Physiology in Health and Illness. 11th ed. Churchill and Livingston, Elsevier
8. Wilson, K. J. W. (1987) Anatomy and Physiology in Health and Illness.6th ed. ELBS, Churchill Livingstone, London.

# E -learning resources

* + https://youtu.be/uFf0zxQ3rBU
  + <http://epgp.inflibnet.ac.in/Home/Download>

# Mapping with Programme Outcomes

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | M | M | L | M | M | S |
| **CO2** | S | S | S | M | M | M | L | M | M | S |
| **CO3** | S | S | S | M | M | M | L | M | M | S |
| **CO4** | S | S | S | M | M | M | L | M | M | S |
| **CO5** | S | S | S | M | M | M | L | M | M | S |

**Mapping with Programme Specific Outcomes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO/PSO** | **PSO1** | **PSO 2** | **PSO 3** | **PSO 4** | **PSO 5** |
| **CO1** | 3 | 3 | 3 | 3 | 3 |
| **CO2** | 3 | 3 | 3 | 3 | 3 |
| **CO3** | 3 | 3 | 3 | 3 | 3 |
| **CO4** | 3 | 3 | 3 | 3 | 3 |
| **CO5** | 3 | 3 | 3 | 3 | 3 |
| **Weightage** | 15 | 15 | 15 | 15 | 15 |
| **Weighted percentage (rounded of) of Course Contribution to Pos** | 3 | 3 | 3 | 3 | 3 |

|  |  |  |
| --- | --- | --- |
| SEMESTER: I  PART: III  CORE: II | **23UNFDC14 : BASICS OF FOOD MICROBIOLOGY**  **(Theory and Practical)** | CREDIT: 5  HOURS: 5/W |

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| **Learning Objectives** |
| To enable the students to : |
| * Gain knowledge on the characteristics of micro-organisms in food and environment. |
| * Understand the role of microorganisms in food spoilage, health and illness. |
| * Familiarize with the methods of controlling microorganisms. |

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| **UNIT** | **CONTENT** | **HOURS** |
| **I** | **Introduction to Microbes in Foods**  History and Development of Food Microbiology Classification of microorganisms. General morphological characteristics of bacteria, yeast, algae. mold, virus.  Characteristics of predominant microorganisms in food, sources of microorganisms in foods. | **15** |
| **II** | **Microbial spoilage and contamination of common food**  Factors affecting growth of microorganisms- intrinsic and extrinsic. Sources of contamination and spoilage of common foods -Cereal and cereal products, fruits and vegetables, egg, meat and fish, milk and milk products. | **15** |
| **III** | **Beneficial uses of microorganisms in food and health** Microorganisms used in fermented products - Alcoholic drinks, Dairy products, Bread, Vinegar, Pickled foods. Single-cell protein  Food Bio preservatives of microbial origin. Intestinal Bacteria and Probiotics. | **10** |
| **IV** | **Food poisoning and Food borne disease**  Food poisoning/ intoxication and food infection- definition. Bacterial food poisoning – Staphylococcus aureus, Clostridium botulinum, Clostridium perfringens, Bacillus cereus  Food Infection- Salmonellosis, Shigellosis, Cholera, Gastroenteritis. Measures to prevent food poisoning and food borne infection. | **15** |
| **V** | **Microorganisms found in water, soil, air and sewage**- List of microorganisms and diseases caused; Test for sanitary quality of water, Purification of water  **Control of Microorganisms in food**  Control of Access of Microorganisms: sanitation, sterilization and disinfection Control by Heat (Thermal Processing), Low Temperature, Reduced Water Activity and Drying, Low pH and Organic Acids, Modified Atmosphere, Reducing O-R Potential) Antimicrobial Preservatives and Bacteriophages Irradiation, Novel Processing Technologies, Combination of Methods (Hurdle Concept) | **20** |
|  | **TOTAL** | **75** |

# COURSE OUTCOMES

**After successful completion of the course the student will be able to**

**CO1.** Comprehend the characteristics of microorganisms in food and its environment and apply the knowledge to control them.

**CO2**. Differentiate between organisms that are beneficial from those causing spoilage.

**CO3**. Explain the causes and prevention of food poisoning and food borne infections.

**CO4**. Identify the microscopic structure of algae, molds, yeast, virus and bacteria.

**CO5.** Perform appropriate tests to identify the size, shape, arrangement and motility of organisms.

# References

1. Parija SC. (2012) Textbook of Microbiology and Immunology, 2nd edition, Elsevier India.
2. Garbutt J. (1997) Essentials of Food Microbiology, 2nd edition, Arnold publication, New York,1997
3. Adams M.R, Moss M.O and Peter.M (2016). Food Microbiology. 4th edition. Royal Society of Chemistry, United Kingdom.
4. Frazier W.C and Westhoff D.C. (1995). Food Microbiology. 5th edition. Tata Mc Graw Hill Publishing Company Ltd, New Delhi.
5. Jay J.M, Loessner MJ and Golden D.A. (2005). Modern Food Microbiology. 7th edition, CBS Publishers and Distributors, New Delhi.
6. Ananthanarayan and Paniker. (2017). Text book of Microbiology, Tenth Edition, Orient Longman Limited, Hyderabad.
7. Ramesh. V. (2007). Food Microbiology, MJP publishers, Chennai.
8. Gerald McDonell. (2020). Block’s Disinfection, Sterilization and Preservation. 6th edition. Lippincott Williams and Wilkins, Philadelphia.

# E- learning resources

* + <http://people.uleth.ca/~selibl/Biol3200/CourseNotes/MicroTaxonomyCh10.pdf>
  + [https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-](https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf) [understand-color- office.pdf](https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf)
  + <https://www.who.int/news-room/fact-sheets/detail/food-safety>
  + [https//epi.dph.ncdhhs.gov/cd/diseases/food.html](https://epi.dph.ncdhhs.gov/cd/diseases/food.html)
  + <http://vikaspedia.in/health/nutrition/food-borne-diseases-or-food-poisoning>
  + <https://www.microrao.com/micronotes/sterilization.pdf>
  + https://ehs.colorado.edu/resources/disinfectants-and-sterilization-methods

# PRACTICAL

1. Study of different equipments in a microbiology lab.
2. Safety practices in microbiology laboratory.
3. Microscopy- principles, parts, function and operation.
4. Microscopic structure of algae, molds, yeast, virus and bacteria.
5. Examination of organisms using simple staining technique.
6. Examination of organisms using gram staining technique.
7. Examination of motility of bacteria using hanging drop technique.
8. Demonstration of sterilization of glassware using hot air oven, autoclave.
9. Demonstration of media preparation-Broth, deep, slant and plates.
10. Demonstration of culture techniques-streak, pour plate.
11. Visit (at least one) to food processing units or any other organization dealing with advanced methods in food microbiology.

# Mapping with Programme Outcomes

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | S | M | S | M | M | S |
| **CO2** | S | S | S | S | L | S | M | M | M | S |
| **CO3** | S | S | S | S | M | S | M | M | M | S |
| **CO4** | S | S | S | S | M | S | M | M | M | S |
| **CO5** | S | S | S | S | M | M | M | M | M | S |

**Mapping with Programme Specific Outcomes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO/PSO** | **PSO1** | **PSO 2** | **PSO 3** | **PSO 4** | **PSO 5** |
| **CO1** | 3 | 3 | 3 | 3 | 3 |
| **CO2** | 3 | 3 | 3 | 3 | 3 |
| **CO3** | 3 | 3 | 3 | 3 | 3 |
| **CO4** | 3 | 3 | 3 | 3 | 3 |
| **CO5** | 3 | 3 | 3 | 3 | 3 |
| **Weightage** | **15** | **15** | **15** | **15** | **15** |
| **Weighted percentage (rounded of) of Course Contribution to Pos** | 3 | 3 | 3 | 3 | 3 |

|  |  |  |
| --- | --- | --- |
| SEMESTER: I  PART: III  ELECTIVE - I | **23UNFDE15 : FOUNDATIONS OF BAKING AND CONFECTIONERY** | CREDIT: 3  HOURS: 4/W |

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| **Learning Objectives** |
| To enable the students to : |
| * Gain insight into the planning and operation of bakery unit. |
| * Familiarize with the equipments and tools, hygienic practices relating to baking |
| * Understand the role of various ingredients used in the making of breads, cakes, cookies, pastries and various confectioneries |
| * Acquire skills in baking and confectionery with an emphasis on special dietary needs. |

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| --- | --- | --- |
| **UNIT** | **CONTENT** | **HOURS** |
| **I** | **An Overview of Bakery Industry**  Current status and growth of bakery industry in India.  Baking – principles, process. Layout and organization of a bakery unit. Equipment and tools used in baking and confectionery. Bakery sanitation and personnel hygiene. | **10** |
| **II** | **Ingredients in Bakery and Confectionery**  Ingredients - Flour, Sugar, Shortenings, Egg, Leavening agents-yeast, baking soda, baking powder, chocolates, cocoa powder. Other ingredients- salt, milk and milk derivatives, malt products, dough improver, oxidizing agents, flavours and colors, nuts, spices and  condiments, preserved and candied fruit peels. | **10** |
| **III** | **Breads and Cakes**  **Bread -** ingredients, types of breads, faults and its prevention  **Cakes** – ingredients, types of cakes, **c**ake judging, faults and remedies. Different types and techniques of cake decoration -icings and fillings. **Related experience**  Preparation of buns, rolls, soup sticks, rusk and pizza base.  Preparation of angel food cake, butter cake, sponge cake, chocolate cake, pound cake.  Modified baked products - high fiber, low / alternate sugar, low fat, gluten free, and millet based bakery products for special nutritional requirements. | **15** |
| **IV** | **Pastries, Cookies and Biscuits**  **Pastries-** types of pastries- puff pastry, short crust, phyllo pastry, flaky pastry, choux pastry  **Cookies & biscuits** – ingredients, types and processing.  **Related experience**  Preparation of biscuits, cookies.  Preparation of pastries- Short crust pastry, flaky pastry, puff pastry, choux pastry. | **15** |
| **V** | **Confectionery and Marketing of Baked Products** Chocolates- production, types, chocolate decorations **S**ugar based confectionery – fudge, fondant, sugar candies.  **Marketing and sales promotion**- costing, packaging and labelling.  **Related experience**  Preparation of plain chocolate, fudge, fondant. | **10** |
|  | **TOTAL** | **60** |

# COURSE OUTCOMES

**After successful completion of the course the student will be able to**

**CO1**. Understand the principles and process of baking and confectionery.

**CO2**. Acquire knowledge on role of various ingredients used in baking and confectionery.

**CO3**. Develop skills to design baked goods using alternative healthy ingredients to cater to special dietary needs

**CO4**. Identify and control faults in baking.

**CO5**. Enhance entrepreneurial skills in bakery and confectionery to establish a bakery unit.

# References

1. John Kingslee (2006) A Professional Text book to Bakery and Confectionary. New Age International Pvt Limited Publisher, New Delhi.
2. Uttam K Singh (2011).Theory of Bakeryand Confectionary- An Operational Approach. Kanishka Publishers and Distributors, New Delhi.
3. Yogamba lAshokkumar (2012) Theory of Bakery and Confectionary, PHI publication. New Delhi.
4. Nicolello, I. and Foote, R (2000). Complete Confectionary Techniques. Hodder and Solution, London.
5. Bakers hand Book on practical Baking (2000) Published by U.S. Wheat Associates, New Delhi.
6. Dubey. S.C (2002) Basic Baking.4th Edition. Published by the Society of Indian Bakers, New Delhi.
7. Sarah R. Lebensky, Pricilla et al., (2004) Textbook of Baking and Pastry Fundamentals, third edition, Pearson Education Ltd.
8. The Culinary Institute of America, Baking & Pastry: Mastering the Art and Craft, John Wiley &Sons, Inc New Jersy. 2009.

# E - LEARNING RESOURCES

* + <https://www.youtube.com/watch?v=dfvkplBBO2g>
  + [https://www.lifestyleasia.com/ind/food-drink/dining/bookmark-the-best-baking-youtube-](https://www.lifestyleasia.com/ind/food-drink/dining/bookmark-the-best-baking-youtube-channels-to-bake-like-a-pro/) [channels-to-bake-like-a-pro/](https://www.lifestyleasia.com/ind/food-drink/dining/bookmark-the-best-baking-youtube-channels-to-bake-like-a-pro/)
  + [www.bakels.in](http://www.bakels.in/)

# Mapping with Programme Outcomes

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | S | M | M | M | S |
| **CO2** | S | S | S | S | M | M | S | M | M | S |
| **CO3** | S | S | S | S | S | S | S | M | S | S |
| **CO4** | S | S | S | M | M | M | L | L | M | S |
| **CO5** | S | S | S | S | S | M | S | S | S | S |

**Mapping with Programme Specific Outcomes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO/PSO** | **PSO1** | **PSO 2** | **PSO 3** | **PSO 4** | **PSO 5** |
| **CO1** | 3 | 3 | 3 | 3 | 3 |
| **CO2** | 3 | 3 | 3 | 3 | 3 |
| **CO3** | 3 | 3 | 3 | 3 | 3 |
| **CO4** | 3 | 3 | 3 | 3 | 3 |
| **CO5** | 3 | 3 | 3 | 3 | 3 |
| **Weightage** | 15 | 15 | 15 | 15 | 15 |
| **Weighted percentage (rounded of)**  **of Course Contribution to Pos** | 3 | 3 | 3 | 3 | 3 |

|  |  |  |
| --- | --- | --- |
| SEMESTER: I  PART –IV  FOUNDATION COURSE - I | **23UNFDF17 : NUTRITION FOR THE FAMILY** | CREDIT: 2  HOURS: 2/W |

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| **Learning Objectives** | | |
| To enable the students to : | | |
| * Understand the basic concepts of nutrition | | |
| * Understand the nutritional demands in various stages of life cycle | | |
| * Acquire skills in planning adequate meals in different stages of life cycle | | |
| * Understand different diet | | |
| * Acquire knowledge on physiological changes | | |
| **UNIT** | | **CONTENT** |
| **I** | | Food groups- basic five, nutritional classification of foods - energy yielding, body building and protective foods - Basic principles of Meal planning – balanced diet- meaning, food guide pyramid. |
| **II** | | Nutritional needs during Pregnancy and Lactation– dietary guidelines; general dietary problems, Common Nutritional related problems and complications. Nutrition during Lactation - Dietary guidelines for lactating women, Composition of Breast Milk. |
| **III** | | Nutrition during Infancy and Preschool age - dietary guidelines for infants, advantages of breast feeding, disadvantages of bottle feeding; Weaning foods (definition) and types of supplementary food. Nutritional needs of Pre-school children, factors to be considered while planning meals for pre-school children. Food habits of Pre School Children |
| **IV** | | Nutrition for School children and Adolescence - dietary guidelines, factors considered in planning packed lunch. School lunch feeding problems. Nutrition during Adolescence – general dietary guidelines; Dietary Problems (Eating Disorders) |
| **V** | | Nutritional needs of Adults and Old Age - dietary guidelines for adults. Nutrition during Old age - physiological changes in ageing, psycho-social factors affecting food intake. Nutrition modification in Diet. |

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to gain knowledge about

1. Physiological changes and hormones involved during pregnancy and lactation.
2. Plan a healthy food choice for physical, physiological, psychological aspects in infancy.
3. The students will be able to relate nutrient needs to developmental stages and plan diets which will adequately meet nutritional needs during childhood.
4. The student will learn the impact of growth and development in arriving at the nutritional needs of adolescents.
5. Determine nutrient requirements during old age.

**Text book**

1. Mahan,L.K &amp;Arlin.M.T, “Krause’s Food,Nutrition and Diet Therapy”, 11th Edition, W.B. Saunder Company, London, (2000).
2. Selelstein. S. &amp; Sharlin.J, “Life Cycle Nutrition”, Jones &amp; Bartlett publications,(2008).
3. Begum. M. R, “A Textbook of Food, Nutrition &amp; Dietetics”, 3rd edition, Sterling publications Pvt. Ltd., (2008).
4. Srilakshmi. B, “Nutrition Science”, 5th edition, New Age International Pvt.Ltd., (2008).
5. Mudambi S.R and Rajagopal M.V, “Fundamentals of foods and Nutrition”, 3rd edition, New Age International Pvt. Ltd., (1997).
6. Pasricha.S, “Some Therapeutic Diets”, 5th edition, National Institute of Nutrition,(2004).
7. ICMR-Nutritive value of Indian Foods, National Institute of Nutrition, Hyderabad, (1989).
8. Mudambi. S.R, Rao. S.M, &amp; Rajagopal.M.V, “Food Science”, New Age International Pvt. Ltd. Publishers, New Delhi, (2007).

**Outcomes Mapping**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** |
| **CO1** | 2 |  |  |  |  |
| **CO2** |  | 2 |  |  |  |
| **CO3** |  |  | 2 |  |  |
| **CO4** |  |  |  | 2 |  |
| **CO5** |  |  |  |  | 2 |

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| SEMESTER: II  PART: III  CORE: III | **23UNFDC23 : FOOD SCIENCE** | CREDIT: 5  HOURS: 5/W |

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| **Learning Objectives** |
| To enable the students to: |
| * Understand the science of food and factors that affect its quality, Nutritive value and shelf life. |
| * Understand the physical, biological and chemical characteristics of various foods and their uses. |
| * Apply knowledge of foods in planning diets and preparing meals that are safe, * nutritious and palatable. |

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| **UNIT** | **CONTENT** | **HOURS** |
| **I** | **Nutrient content of foods and Cooking Methods -** Classification of foods according to nutrient content. Food groups for balanced diets. Study of the different cooking methods- dry heat, moist and combination methods, solar cooking, microwave cooking - merits and demerits, dishes prepared by these methods. | **10** |
| **II** | **Cereals**, **Millets**, **Pulses, Legumes and Nuts -** Classification of Cereals, Structure, nutrient composition, storage, processing, milling, parboiling, scientific methods of preparation and cooking, acceptability and palatability of rice, wheat, maize and millets Cooking of starches- Dextrinization and gelatinization, retrogradation and resistant starch.  **Pulses and legumes** - Types, nutritive value, methods of cooking, effect of soaking and germination, judicious combination of cereals and pulses- complementary effect, soya beans, fava beans and kesari dhal- methods to inactivate /remove toxins; storage.  **Nuts** - types, composition, market forms, roasting, steaming of nuts, nuts butters; uses in sweets, baking, and confectionery; Storage.  **Oilseeds** - types, methods of processing, uses and shelf life | **10** |
| **III** | **Vegetables and Fruits Vegetables:**  Classification, nutritive value, effect of cooking on colour, texture, flavour, appearance and nutritive value, Purchase - storage and preservation  **Fruits:**  Classification, nutritive value, changes during ripening, enzymatic browning, uses, preservation. | **10** |
| **IV** | **Flesh foods, Eggs, and Milk**  **Meats** – structure, nutritive value, selection of meat, postmortem changes in meat, ageing, factors affecting tenderness of meat, methods of cooking and storage.  **Poultry**-types, nutritive value, selection and cooking  **Fish** - classification, nutritive value, selection, storage, cooking and preservation. | **15** |
| **Eggs**  Structure, nutritive value, methods of cooking, storage, preservation and uses in cookery; foam formation and factors affecting foam. formation  **Milk and milk products**  Nutritive value, kinds of milk, pasteurization, and homogenization, coagulation of milk, fermentation of milk; milk products - whole and skimmed milk, milk powders and yogurt, ghee, butter, cheese. Storage and preservation. |  |
| **V** | **Fats and oils, sugars, food adjuncts and beverages Fats and Oils**: Types, sources-animal fats and vegetable fats, functions, processing- difference between cold pressed and regular cooking oils, hydrogenated fat, emulsification, rancidity, smoking point. Factors affecting absorption of oils while frying foods, harmful effects of reheated oils.  **Sugars:**  Types and market forms of sugars; stages of sugar cookery, crystallization, factors affecting crystallization, uses in confectionery. **Food adjuncts and food additives**  Spices and condiments: classification, source, use in food preparation, Leavening agents, stabilizers, thickeners, anticaking agents, enzymes, shortenings, stabilizers, flavouring agents, colouring agents, sweeteners-use and abuse.  **Food adulteration**  Definition, common adulterants in food  **Beverages**  Classification-fruit based beverages; milk-based beverages nutritive. value and uses, alcoholic beverages, coffee, tea and cocoa, malted. beverages. Sources, manufacture, processing, and service; methods of preparation of coffee and tea. | **15** |
|  | **PRACTICAL**   1. Cereal and Pulse - Experimental Cookery, gelatinization, Dextrinisation 2. Vegetable and Fruit - Experimental Cookery, enzymatic browning. 3. Meat, Egg and Milk- Experimental Cookery; whipping quality of eggs 4. Study of the smoking temperature of Fats 5. Stages of Sugar cookery, factors affecting crystallization 6. Preparation of coffee and tea by different methods. 7. Preparation of one dish each applying the different cooking methods | **15** |
|  | **TOTAL** | **75** |

**ACTIVITY**

* A survey of processed forms of cereals, pulses, dairy/meat products available in the market Comparison of convenience foods and natural/whole foods
* Market survey of processed beverages
* Identify common adulterants in foods

# COURSE OUTCOMES

**After successful completion of the course the student will be able to**:

**CO1.** Identify foods based on food groups and list their uses.

**CO2.** Describe classification, nutritive value, storage and preservation of foods.

**CO3**. Explain changes in food due to cooking, processing and factors that affect palatability, acceptability, and nutritive value.

**CO4.** Compare different methods of cooking and select the methods best suited for cooking different Foods.

**CO5.** Justify the selection, processing, storage, and cooking methods to preserve nutritive values of various foods and make them safe and acceptable.

# References:

1. Manay, S. and Shadaksharaswamy, M. (1987) Foods Facts and Principles. New Age International Publishers, New Delhi.
2. Peckham, G.C. and Freeland-Graves, J.H. (1979) Foundations of Food Preparation, 4th edition, Macmillan Publishing Co. Inc., New York**.**
3. Shewfelt R.L. (2015) Introducing Food Science. CRC Press, Taylor and Francis Group. Boca Raton
4. Srilakshmi B (2019) Food Science, (7th Ed.) New Age International Publishers
5. Thangam E.Philip, Modern Cookery for Teaching and the Trade Volume - 1&2 (6th Revised Edition), Orient Black
6. Vaclavik, V.A. and Elizabeth, W.C. (2013) Essentials of Food Science.2nd ed.

Springer Publication, New Delhi

# E-Learning resources

* [https://ia801408.us.archive.org/20/items/textbookoffoodsc0000khad/textbookoffoodsc00](https://ia801408.us.archive.org/20/items/textbookoffoodsc0000khad/textbookoffoodsc0000khad.pdf) [00khad.pdf](https://ia801408.us.archive.org/20/items/textbookoffoodsc0000khad/textbookoffoodsc0000khad.pdf)
* <https://egyankosh.ac.in/handle/123456789/32947> <https://unacademy.com/content/kerala-psc/study-material/basic-food-science/>

# Mapping with Programme Outcomes

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | L | S | M | S | M | M | S |
| **CO2** | S | S | S | L | S | M | S | M | M | S |
| **CO3** | S | S | S | L | S | M | S | M | M | S |
| **CO4** | S | S | S | L | S | M | S | M | M | S |
| **CO5** | S | S | S | L | S | M | S | M | M | S |

**Mapping with Programme Specific Outcomes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO/PSO** | **PSO1** | **PSO2** | **PSO3** | **PSO4** | **PSO5** |
| **CO1** | 3 | 3 | 2 | 3 | 3 |
| **CO2** | 3 | 3 | 2 | 3 | 3 |
| **CO3** | 3 | 3 | 2 | 3 | 3 |
| **CO4** | 3 | 3 | 2 | 3 | 3 |
| **CO5** | 3 | 2 | 2 | 3 | 3 |
| **Weightage** | 15 | 14 | 10 | 15 | 15 |
| **Weighted percentage (rounded of) of Course Contribution to Pos** | 3 | 3 | 2 | 3 | 3 |

|  |  |  |
| --- | --- | --- |
| SEMESTER: II  PART: III  PRACTICAL: III | **23UNFDP24 : BASIC COOKERY PRACTICAL** | CREDIT: 5  HOURS: 5/W |

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| **Learning Objectives** |
| To enable the students to : |
| * Learn the principles and scientific methods of cooking |
| * Learn the best methods of cooking foods to preserve its nutrient content and minimize cooking time. |
| * Apply the principles of cookery to prepare tasty and nutritious food |

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| **UNIT** | **CONTENT** | **HOURS** |
| **I** | **Introduction to Basic Cooking Skills**  Introduction to different cooking methods, cooking terminology; equipment and techniques used for pre-preparation and for different cooking methods.  Methods of measuring and weighing liquids and dry ingredients .The use and care of simple kitchen equipment.  Introduction to food safety, sanitation and hygiene in the kitchen, Safe practices in handling knives, sharp instruments and materials at high temperature. | **10** |
| **II** | **Cereals, Millets and pulses**  **Cereals and Millets:** Methods of combining fine and course cereal with Liquid (eg.Ragi porridge,rava upma)  Method of cooking cereals and factors influencing texture and nutritive value- cooking rice by boiling and straining, absorption method, steaming, pressure cooking, microwave cooking; Gelatinization and dextrinization  Preparation of recipes using rice-puttu, dosai,idli/idiappam, lemon rice, curd rice, coconut rice, fried rice, tamarind rice, tomato rice, mint pulao- a few. Wheat and Millet preparations - Kesari, Phulka, poori, paratha, naan, ragi adai, samai curdrice, thinai uppuma, -a few  **Pulses:**  Factors influencing texture, digestibility and nutritive value of whole gram/legumes andpulses -soaking, addition of soda bicarbonate, addition of salt, water quality- hard and softwater, pressure cooking, boiling and straining.  Pulse preparations- Sundal, sambhar, sprouted green gram patchadi, Vadai, pongal, ompodi, green gram payasam, masala vadai ,medhu vadai-a few | **15** |
| **III** | **Vegetables and Fruits**  **Vegetables:** Basic cuts of vegetables-Slice and mince (onions) Shred (cabbage, spinach),dice (carrot), chop (tomato), grating (beetroot), and their uses in dishes. Changes in colour and texture of vegetables and nutritive value due to different methods of cooking, cooking medium and addition of acid/alkali.  Vegetable preparations – Poriyal, Aloo methi curry, vegetable cutlet, thoran, vegetablekurma, avial, keerai maseal, vegetable salad, vegetable soup, vegetable sandwich, kootu,mint chutney and carrot halwa.  **Fruits:**  Enzymatic browning in fruits and methods to prevent it. Fruit preparations- stewed apple, banana fritters, fruit salad, fruit punch, fruit yoghurt and fruit smoothie, preserve/ jam. | **20** |
| **IV** | **Eggs,milk and milk products ,meat and fish:**  **Egg Cookery:**  Boiling of eggs-hard and soft boiled eggs. Best method of boiling eggs. Prevention of Ferrous sulphide formation on the yolk. Poaching and frying. Coagulation of egg protein-stirred and baked custard  Egg preparations - egg curry, omelet, French toast, caramel custard (steamed), scrambled eggs and fried eggs- a few Factors affecting whipping quality of egg white – effect of salt, sugar, vinegar, fatand milk, type of container used and beaters, Stages of foam formation in whipped egg whites and their uses in cookery.  **Milk and milk products**  Curdling of milk using lime juice, butter milk, tomato juice,  **Milk preparations**  Cream of tomato soup, paneer masala, payasam, patchadi, thayir vadai, morkulumbu, basundhi, lassi, spiced buttermilk and baked macaroni and cheese.  **Meat and Fish**  Methods of tenderizing meat-Pounding, mincing addition of acids like curd/limejuice in marinade, addition of proteolytic enzymes-raw papaya Effect of different methods of cooking on flavour, texture and appearance of meatand fish.  Meat preparations - mutton ball curry, mutton vindaloo, mutton keema, liver fry,chicken spring roll, chicken sweet corn soup, chicken biriyani. Sea food preparations- fish fry, fish moilee, fish cutlet, sweet and sour prawns. | **15** |
| **V** | **Sugar cookery, Fats and oils food additives and raising agents Sugar Cookery -** Stages of sugar cookery and uses. Preparations of sweets using different stages of sugar cookery  **Fats and oils -** Effect of temperature of oil on texture and palatability of foods- Frying pooris atdifferent temperatures  Smoking point of oil - bread cube test.  Emulsions- definition, Preparation of mayonnaise  **Food additives and Raising agents**  Role of MSG, sodium benzoate and KMS in food preparation and preservation.,Natural versus synthetic preservatives, -Advantages and limitations Use of baking soda, baking powder, yeast in baking and food preparation- Prepare one dish with each of these  Uses of herbs and spices to enhance flavour. | **15** |
|  | **TOTAL** | **75** |

# COURSE OUTCOMES

**After successful completion of the course the student will be able to:**

**CO1.** Identify appropriate methods for weighing dry and wet food ingredients and for cooking different foods.

**CO2**. Select suitable methods for cooking cereals, pulses, vegetables, meat, fish and Poultry.

**CO3.** Apply the principles of cookery, cooking techniques and suitable ingredients in preparing dishes.

**CO4.** Explain the reasons behind the changes that occur during food preparation.

**CO5.** Justify the best preparation and cooking methods for acceptability and retention of nutrients in different dishes

# References:

1. Martland, R.E. and Welsby, D.A. (1980) Basic Cookery, Fundamental Recipes and Variations. William Heinemann Ltd., London.
2. Krishna Arora (2008) Theory of cookery, Frank Brothers & Co.,
3. Negi J (2013) Fundamentals of Culinary Art, S.Chand and Co.
4. Peckham,G .C .and Freeland- Graves,J.H. (1987) Foundation of food preparation.4the d. Macmillan Publishing co, New York
5. Penfield MP and Ada Marie C (2012), Experimental Food Science, Academic Press,,San Diego

# E- Learning Resources:

* <https://www.ihmnotes.in/assets/Docs/Books/Theory_of_Cookery.pdf>
* <http://staffnew.uny.ac.id/upload/132318572/pendidikan/buku-esp.pdf>

# Mapping with Programme Outcomes

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|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | L | S | M | S | L | L | S | S | S |
| **CO2** | S | L | S | S | S | M | S | S | M | S |
| **CO3** | S | M | S | S | S | M | S | M | M | S |
| **CO4** | S | S | S | S | S | M | S | M | M | S |
| **CO5** | S | S | S | S | S | L | S | S | M | S |

**Mapping with Programme Specific Outcomes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO/PSO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** |
| **CO1** | 3 | 3 | 1 | 3 | 3 |
| **CO2** | 3 | 3 | 1 | 3 | 3 |
| **CO3** | 3 | 3 | 1 | 3 | 3 |
| **CO4** | 3 | 3 | 2 | 3 | 3 |
| **CO5** | 3 | 3 | 1 | 3 | 3 |
| **Weightage** | 15 | 15 | 6 | 15 | 15 |
| **Weighted percentage (rounded of) of Course Contribution to Pos** | 3 | 3 | 1 | 3 | 3 |

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| --- | --- | --- |
| SEMESTER: II  PART: III  ELECTIVE: II | **23UNFDE25 : FOOD PRODUCT DEVELOPMENT** | CREDIT: 3  HOURS: 4/W |

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| **Learning Objectives** |
| To enable the students to : |
| * Understand the steps involved in new food product development. |
| * Learn about consumer preferences and market trends. |
| * Understand concepts about subjective and objective evaluation of new product. |

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| **UNIT** | **CONTENT** | **HOURS** |
| **I** | **Introduction to New Food Product development**  Food products, definition, Classification, Characterization Reasons for new food product development  Factors shaping new product development-Social concerns, health concerns impact of technology and marketplace influence.  Utilizing traditional foods, unconventional sources, functional, nutraceuticals foods for new product development  Market Survey to identify the new product. | **7** |
| **II** | **Product Development:**   1. New Product Development Team 2. Sources of New Product ideas 3. Designing new product 4. Stages of product development 5. Causes of product failure/ success in product development | **8** |
| **III** | **Product Evaluation and Quality Control**  Quality attributes – physical, chemical, nutritional, microbial, and sensory indicators Principles and types of assessment of quality. Subjective and objective methods of evaluation of product quality.  Role of sensory evaluation in consumer product acceptance; requirements for sensory analysis - Sensory panel  Evaluation of New Product: Nutritional evaluation (estimation of relevant parameters) Evaluation of shelf-life of the product (testing for appropriate quality parameters- physical, chemical, microbiological and nutrient content, acceptability studies)  Food safety standards and regulations: Domestic regulations FSSAI, AGMARK, BIS Quality management systems in India; (ISO9001, ISO22000); Global Food safety Initiative; International food standards Various national and international organizations dealing with inspection, traceability and authentication, certification, and quality assurance. | **15** |
| **IV** | **Packaging and labelling**  Packaging Material-types; factors affecting type of packaging material used; Aseptic packaging, modified atmosphere packaging, Controlled Atmosphere Packaging and active packaging.  Packaging and Labelling of the product – Packaging design, graphics and labelling – FSSAI regulations for food labelling. | **10** |
| **V** | **Marketing the product**  Product life cycle  Costing the product and determining the sales price Advertising and test marketing the product | **10** |
|  | **PRACTICAL**   1. Survey of types of convenience foods / novel foods in the market or Survey of market trends and consumer behavior in the food sector. 2. Sensory analysis: conduct sensory tests for basic tastes and sensory attributes of products. 3. Basic evaluation of shelf -life acceptability and quality of a food product. 4. Evaluate consumer responses utilizing prepared food products, analyse and present data on acceptability of product based on sensory evaluation or 5. Project Development of a new food product, standardization, selection of suitable packaging and   preparing label with product information. | **10** |
|  | **TOTAL** | **60** |

**COURSE OUTCOMES**

# After successful completion of the course the student will be able to:

**CO1.** Define the basic concepts in food product development, packaging, costing advertising and marketing.

**CO2.** Explain the need, characteristics and factors influencing the new product; test marketing, packaging and quality attributes.

**CO3.** Illustrate the quality attributes, food safety, packaging and labelling regulations, and marketing tools for a food product.

**CO4.** Analyse the significance of packaging, labelling, advertising, costing and quality concepts for the new food product

**CO5.** Develop a new food product and evaluate its quality and acceptability.

# References:

1. Earle M., Earle RL. and Anderson A. (2001) Food Product Development: Maximizingsuccess, Woodhead Publishing Ltd, Food Series, No. 64,2001.
2. Fuller, GW (2011). New food product development: From concept to marketplace. 3rded. New York, NY: CRC Press
3. Lawless HT and Klein BP (1991) Sensory Science Theory and Applications in Foods.Marcel Dekker Inc.
4. Moskowitz HR, Saguy IS and Straus T (2009). An Integrated approach to New FoodProduct Development. ed. New York, NY: CRC Press
5. Paine FA, Paine HY (Eds.) (1992) A handbook of Food Packaging (2nd ed.), BlackieAcademic and Professional.
6. Sharma A (2018). Food product Development. CBS Publishers & Distributors Pvt Ltd

# E- Learning Resources:

* [https://www.destechpub.com/wp-content/uploads/2015/01/Methods-for-](https://www.destechpub.com/wp-content/uploads/2015/01/Methods-for-Developing-New-Food-Products-preview.pdf) [Developing-New-Food-Products-preview.pdf](https://www.destechpub.com/wp-content/uploads/2015/01/Methods-for-Developing-New-Food-Products-preview.pdf)
* <https://www.youtube.com/watch?v=iL0iIGpa4vg>
* <https://www.youtube.com/watch?v=5kOXUH8kaCs>

# Mapping with Programme Outcomes

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|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | M | M | M | L | S | L | M | S |
| **CO2** | S | S | S | S | M | M | S | M | M | S |
| **CO3** | S | S | S | M | M | M | S | M | M | S |
| **CO4** | S | S | S | S | M | M | S | S | M | S |
| **CO5** | S | S | S | M | M | M | S | S | M | S |

**Mapping with Programme Specific Outcomes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO/PSO** | **PSO1** | **PSO 2** | **PSO 3** | **PSO 4** | **PSO 5** |
| **CO1** | 3 | 3 | 1 | 3 | 3 |
| **CO2** | 3 | 3 | 3 | 3 | 3 |
| **CO3** | 3 | 3 | 2 | 3 | 3 |
| **CO4** | 3 | 3 | 3 | 3 | 3 |
| **CO5** | 3 | 3 | 1 | 3 | 3 |
| **Weightage** | 15 | 15 | 10 | 15 | 15 |
| **Weighted percentage (rounded of)**  **of Course Contribution to Pos** | 3 | 3 | 2 | 3 | 3 |

Non-major (NME) courses offered to other Department

|  |  |  |
| --- | --- | --- |
| SEMESTER: I | 23UNFDN16 : CLINICAL NUTRITION | CREDIT: 2  HOURS: 2/W |

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| **Learning Objectives** |
| To enable the students to : |
| * Understand the aetiology, physiologic and metabolic anomalies of acute and chronic diseases and patient needs. |
| * Understand the biochemical changes of the disorder and to learn the clinical significance of biochemical findings. |
| * Be familiar with recent advances in the medical nutritional management of various diseases |

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| **UNIT** | **CONTENT** | **HOURS** |
| **I** | **Biochemical changes due to disorders of metabolism**  Metabolic and Nutritional implications in Diabetes mellitus, Inborn errors of metabolism – Gout, phenylketonuria, Galactosemia, Lactose intolerance, Ageing – physiological changes with ageing. Cellular adaptations to stress | **15** |
| **II** | **Cardiovascular Disorders**  Metabolic and Nutritional implications of Myocardial infarction, atherosclerosis hyperlipidaemia, hypertension, metabolic syndrome, Role of lipids in cardiovascular disease and Recent advances. | **10** |
| **III** | **Digestive System, Liver and Pancreatic Disorders**  Metabolic and Nutritional implications of Diarrhoea, constipation. Gastritis, ulcers, colitis, malabsorption syndrome, celiac disease, Inflammatory bowel disease, Irritable bowel syndrome, Diet and gut microflora. Recent advances.  Metabolic and nutritional implications of Hepatitis. Cirrhosis of liver,  Hepatic coma, Pancreatitis, Cholecystitis and Cholelithiasis. Recent advances | **10** |
| **IV** | **Renal Disorders**  Metabolic and nutritional implications of Nephritis, Nephrotic syndrome, Renal Transplant, Nephrolithiasis and Dialysis. Role of kidney in Water and Electrolyte Balance and Imbalance. | **15** |
| **V** | **Carcinogenesis**  Carcinogens in Food, Types of cancer, Causes, pathogenesis, cancer cachexia, Effect of cancer on metabolism and nutritional status, Recent developments in nutrition and cancer. | **10** |
|  | **PRACTICAL**   1. Analysis of urine 2. Collection of blood and separation of plasma and serum 3. Estimation of blood glucose 4. Estimation of total protein 5. Determination of A/G ratio 6. Estimation of serum urea 7. Estimation of serum creatinine 8. Estimation of cholesterol 9. Estimation of Bilirubin | **15** |
|  | **Total** | **75** |

# COURSE OUTCOMES

**After successful completion of the course the student will be able to:**

**CO1.** Describe the biochemical changes due to disorders of metabolism

**CO2.** Comprehend the metabolic and nutritional intervention of various disorders.

**CO3**. Evaluate and formulate dietary recommendations and customized diet plans based on clinical condition.

**CO4**. Illustrate the etiology, manifestation and assessment of diseases of the heart, liver, gallbladder, kidneys and gastrointestinal tract.

**CO5.** Exhibit skills in qualitative and quantitative estimation of blood and urine samples.

# REFERENCES

1. Schlenker, E., & Gilbert, J. A., (2018), Williams' Essentials of Nutrition and Diet Therapy- E-Book. Elsevier Health Sciences.
2. Wardlaw, GM., (2004), Contemporary Nutrition, 2nd edition, Mosby Publishing.
3. Rolfes, S. R., Pinna, K., & Whitney, E. (2020), Understanding normal and clinical nutrition, Cengage learning.
4. Carol Byrd – Bredbenner, (2013), Wardlaw's perspectives in Nutrition, 9th edition McGraw

– Hill International Edition.

1. Mahan L.K., Sylvia Escott-Stump, (2012), Krause’s Food Nutrition and Diet Therapy, 13th edition, W.B. Saunders Company, London.
2. Srilakshmi B., (2014), Dietetics, 7th edition, New Age International Pvt. Ltd. New Delhi.
3. Antia F.P., Abraham P, (2002), Clinical Dietetics, 4th edition, Oxford Publishing Company.
4. Whitney, E., & Rolfes, S. R., (2018), Understanding nutrition. Cengage Learning.

# E - LEARNING REFERENCES

* + <https://www.nutrition.gov/>
  + <https://nutrition.org/>
  + [Nutrition Resources for Online Learning (healthyeating.org)](https://www.healthyeating.org/products-and-activities/curriculum/online-learning)

# Mapping with Programme Outcomes

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | M | S | L | L | M | S |
| **CO2** | S | S | S | M | M | S | L | L | M | S |
| **CO3** | S | S | S | M | M | S | L | L | M | S |
| **CO4** | S | S | S | M | M | S | L | L | M | S |
| **CO5** | S | S | S | M | M | S | L | L | M | S |

**Mapping with Programme Specific Outcomes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO/PSO** | **PSO 1** | **PSO 2** | **PSO 3** | **PSO 4** | **PSO 5** |
| **CO1** | 3 | 3 | 3 | 3 | 3 |
| **CO2** | 3 | 3 | 3 | 3 | 3 |
| **CO3** | 3 | 3 | 3 | 3 | 3 |
| **CO4** | 3 | 3 | 3 | 3 | 3 |
| **CO5** | 3 | 3 | 3 | 3 | 3 |
| **Weightage** | 15 | 15 | 15 | 15 | 15 |
| **Weighted percentage (rounded of) of Course Contribution to Pos** | 3 | 3 | 3 | 3 | 3 |

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| --- | --- | --- |
| SEMESTER: II | 23UNFDN26 : HOSPITAL FOOD SERVICE ADMINISTRATION | CREDIT: 2  HOURS: 2/W |

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| **Learning Objectives** |
| To enable the students to : |
| * Define role of hospital food service administration |
| * Develop skills to maintain medical records. |
| * Understand the management of resources in hospitals |
| * Design hospital diets and housekeeping department |
| * Knowledge about financial management |

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| **UNIT** | **CONTENT** |
| **I** | **Introduction to hospitals**  Hospital based health care and its changing scenario, Effects of globalization on healthcare, concepts of corporate hospitals in developing countries, infrastructure and lay out of anideal corporate hospital, functioning of modern hospital and changing needs of patients. |
| **II** | **Patient care services**  Patient Care Services, Patient Admission / discharge. Functioning of Outpatient -In patient - Emergency Services -Operation theatre -Intensive care - Superspecialty. Planning and schedule of work |
| **III** | **Objectives functioning of Supportive Services**  Lab services -Radiology and Imaging services, Blood bank services, HomeServices,  diagnostic services, physiotherapy. Medical records services-Housekeeping- Laundry-Stores - Health Insurance |
| **IV** | **Hospitality in hospital care**  Function, structure, organisation and management of Dietary Department. Diet planning for hospital diets. Purchasing, storage and quantity food production, patient compliance, food production, serving to patient- tray and trolley service, plate waste management, washing and garbage disposal |
| **V** | **Management of Hospital services**  Importance of Marketing and Material management, Human resource management, managerial accounting and financial management, inventory management. Types of computer systems used for reservation systems, point of sale systems (POS) and property management systems. (PMS). Meaning and importance of Hospital audit. |

**COURSE OUTCOMES**

1) Understand the functioning of hospitals

2) Manage the patient care and auxiliary and supportive care services.

3) Plan menu to satisfy the nutritional, dietary and medical needs of patients

4) Understand the functions of the management of hospital administration.

5) Gain knowledge on Hospital based healthcare and it changing scenario.

**Text Books**

1) Sudhir Andrews, Front Office Management and Operations, 2008, Tata Mc Graw – Hill Publishing Company Ltd.

2) Sakharka B M, Principles of Hospital Administration and Planning, 2009, 2nd Edition, Jaypee Brothers Medical Publishers (p) Ltd.

3) Sherry Glied and Peter Smith, The Oxford Handbook of Health Economics,2011

**Supplementary Reading**

1) Jan Abel Olsen, Principles in Health Economics and Policy, 2009, Oxford University Press.

2) Mohinder Chand, Managing Hospitality Operations, 2009, 1st Edition, Anmol Publications Pvt. Ltd. New Delhi.

3) Goel S.L, Health Care System and Hospital Administration, 2009, Vol.7, Deep and Deep Publications Pvt. Ltd.

**Outcomes Mapping**

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| --- | --- | --- | --- | --- | --- |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** |
| **CO1** | 2 |  |  |  |  |
| **CO2** |  | 3 |  |  |  |
| **CO3** |  |  | 2 |  |  |
| **CO4** |  |  |  | 3 |  |
| **CO5** |  |  |  |  | 2 |