

THE UNIVERSITY OF BURDWAN



**Syllabus for
Three Years Degree/Four Years Honours
in Nutrition**

**Under
Curriculum and Credit Framework for Undergraduate Programmes (CCFUP)
[AS PER NEP, 2020]**

(With effect from - Session 2023-24)

SEMESTER WISE AND COURSE WISE CREDIT DISTRIBUTION
STRUCTURE

SEMESTER - I						
Course Name	Title of the Course	Credits	Full Marks	Marks Division		
				Th.	Pr.	IA
		L-T-P				
Major/DS Course Code: NUTR 1011	CONCEPT OF FOOD, NUTRITION AND HEALTH	4 (3-0-1)	75	40	20	15
Minor Course Code: NUTR 1021	FOOD GROUPS, NUTRIENTS AND NUTRITION	4 (3-1-0)	75	60	-	15
Multidisciplinary/ Interdisciplinary Course Code: NUTR 1031	NUTRITION AND COMMUNITY HEALTH	3 (2-1-0)	50	40	-	10
Ability Enhancement Course (AEC) Code: AEC 1041	L₁-1 MIL (Arabic/Bengali/Hindi/Sanskrit/ Santali/Urdu or Equivalent Course from SWAYAM or UGC recognized other courses)	2 (2-0-0)	50	40	-	10
Skill Enhancement Course (SEC) Code: NUTR 1051	DIABETES AND DIABETES MANAGEMENT	3 (2-1-0)	50	40	-	10
Common Value Added (CVA) Course Code: CVA 1061	Environmental Science/ Education	4	100	60	20	20
Total		20	400	-	-	-

SEMESTER - II

Course Name	Title of the Course	Credits	Full Marks	Marks Division		
		L-T-P		Th.	Pr.	IA
Major/DS Course Code: NUTR 2011	NUTRITION IN PHASES OF HUMAN LIFE	4 (3-0-1)	75	40	20	15
Minor Course Code: NUTR 2021	HUMAN NUTRITION AND PHASES OF LIFE	4 (3-1-0)	75	60	-	15
Multidisciplinary/ Interdisciplinary Course Code: NUTR 2031	MATERNAL NUTRITION	3 (2-1-0)	50	40	-	10
Ability Enhancement Course (AEC) Code: AEC 2041	L2-1 MIL (English or Equivalent. Course from SWAYAM or UGC recognized other other courses)	2 (2-0-0)	50	40	-	10
Skill Enhancement Course (SEC) Code: NUTR 2051	PATHOLOGY AND LABORATORY TECHNIQUES	3 (2-1-0)	50	40	-	10
Common Value Added (CVA) Course Code: CVA 2061	Understanding India/Digital and Technological solutions/Health and wellness, Yoga Education, Sports and Fitness	4	100	80/60	0/20	20
Total		20	400	-	-	-

Note:

1. Skill based vocational course (addl. 4 cr) during summer term for 8 weeks for those who will leave the programme after securing 40 cr.
2. For UG Certificate 40 cr + Additional 4 cr (work based vocational course) = 44 cr. Students are allowed to re-enter within 3 years within the stipulated max. period of 7 years

SEMESTER – I

MAJOR COURSE

CONCEPT OF FOOD, NUTRITION AND HEALTH

(Code: NUTR 1011)

[TOTAL CREDITS: 4 (THEORY-3, PRACTICAL-1)]

Course Outcome:

The students will have a basic concept on food, nutrition and health. The students will be able to understand the chemistry of food components like proteins, carbohydrates and lipids. They will have fundamental concept about various food commodities.

1. Basic concept of Food, Nutrition and Health:

- Definition: Food, Nutrients, Nutritive value, Nutrition, Malnutrition, Undernutrition
- Functions of food, Balanced Diet.
- Food Groups, Food Pyramid, Myplate
- Concept of health and dimensions of health

2. Cereals, Pulses and Legumes:

- Nutritional aspects of wheat, rice and oat.
- Types of pulses and legumes, uses, and nutritional aspects.

3. Milk and Milk Products:

- Composition and nutrients of milk
- Nutritive value and Concept of milk processing and Pasteurization
- Types of processed milk, milk products (butter, curd, paneer and cheese)
- Probiotics in fermented milk products

4. Egg, Fish and Meat:

- Uses and nutritional aspects of edible fish, egg and meat, concept of red and white meat.

5. Vegetables and Fruits:

- Uses and nutritional aspects of commonly available vegetables.
- Fresh fruits and dry fruits – raw and processed product.

6. Salts, Fats and Oils:

- Uses and nutritional aspects of various salts.
- Types, sources, use and nutritional aspects of fats and oils.

7. Beverages:

- Common types (tea, coffee and wines) and their uses, nutritional aspects.

8. Food adjuncts and preserved products:

- Spices (Chilies, Turmeric, Garlic and Ginger), their uses and nutritional aspects.
- Jams, Jellies, Pickles, Syrup, Squashes – uses and nutritional aspects.

9. Methods of cooking:

- Dry, moist, frying and microwave cooking.
- Effects of various methods of cooking on foods, nutrient losses in cooking.

PRACTICAL:

Food Preparation:

- Beverages (Milk shake/Lassi), Cereals (Fried Rice/Chapatti), Milk and milk products (Custard/Payasam) and Snacks (Poha/Sandwiches) [Any one from each category].
- Preparation of homemade ORS.
- Preparation of weaning foods for infants (Soup/Khichuri) [Any one item].
- Preparation of low cost and medium cost school tiffin. [Any one item]
- Qualitative test for milk (Phosphatase test)
- Qualitative test for Vitamin C (any fruit/fruit juice)

Suggested readings:

- ❖ Hughes O, Bennion M (1970). Introductory Foods, Macmillan & Co. New York.
- ❖ Lavies S (1998). Food Commodities.
- ❖ Pomeranz Y (Ed.) (1991). Functional Properties of Food Components (2nd edn.), Academic Press, New York.
- ❖ Tindall HD (1983). Vegetables in the Tropics, MacMillan Press, London.
- ❖ Winton AL, Winton KB (1999). Techniques of Food Analysis. Allied Scientific Publishers.

MINOR COURSE

FOOD GROUPS, NUTRIENTS AND NUTRITION

(Course Code: NUTR 1021)

[TOTAL CREDITS: 4 (THEORY-3, Tutorial-1)]

Course Outcome:

The students will have a basic concept on food, nutrition and health. The student will be able to understand the chemistry of food components like proteins, carbohydrates and lipids. They will have fundamental concept about various food commodities.

1. Basic concept of Food, Nutrition and Health:

- Definition: Food, Nutrients, Nutritive value, Nutrition, Malnutrition, Undernutrition
- Functions of food, Balanced Diet.
- Food Groups, Food Pyramid, Myplate
- Concept of health and dimensions of health

2. Cereals, Pulses and Legumes:

- Nutritional aspects of wheat, rice and oat.
- Types of pulses and legumes, uses and nutritional aspects.

3. Milk and Milk Products:

- Composition and nutrients of milk
- Nutritive value and concept of milk processing and Pasteurization
- Types of processed milk, milk products (butter, curd, paneer and cheese)
- Probiotics in fermented milk products

4. Egg, Fish and Meat:

- Uses and nutritional aspects of edible fish, egg and meat, concept of red and white meat.

5. Vegetables and Fruits:

- Uses and nutritional aspects of commonly available vegetables.
- Fresh fruits and dry fruits – raw and processed product.

6. Salts, Fats and Oils:

- Uses and nutritional aspects of various salts.
- Types, sources, uses and nutritional aspects of fats and oils.

7. Beverages:

- Common types (tea, coffee and wines) and their uses, nutritional aspects.

8. Food adjuncts and preserved products:

- Spices (Chilies, Turmeric, Garlic and Ginger), their uses and nutritional aspects.
- Jams, Jellies, Pickles, Syrup, Squashes – uses and nutritional aspects.

9. Methods of cooking:

- Dry, moist, frying and microwave cooking.
- Effects of various methods of cooking on foods, nutrient losses in cooking.

Suggested readings:

- ❖ Hughes O, Bennion M (1970). Introductory Foods, Macmillan & Co. New York.
- ❖ Lavies S (1998). Food Commodities.
- ❖ Pomeranz Y (Ed.) (1991). Functional Properties of Food Components (2nd edn.), Academic Press, New York.
- ❖ Tindall HD (1983). Vegetables in the Tropics, MacMillan Press, London.
- ❖ Winton AL, Winton KB (1999). Techniques of Food Analysis. Allied Scientific Publishers.

INTERDISCIPLINARY/ MULTIDISCIPLINARY COURSE
(IDC/MDC)

NUTRITION AND COMMUNITY HEALTH
(Course Code: NUTR 1031)

[TOTAL CREDITS: 3 (THEORY-2, TUTORIAL-1)]

Course Outcome:

The students will have a basic concept on food, nutrition and health. The students will be able to understand the importance of food components like proteins, carbohydrates and lipids. They will have fundamental concept about various food commodities. The students will be able to understand the fundamentals of nutrition, food and health. They will be familiarized with the importance of nutrition during various stages of life. They will have a sound knowledge regarding epidemiology and management of nutritional disorders, obesity, hypertension and coronary heart disease, diabetes and also some viral, bacterial and protozoan diseases. Students will have knowledge on National Nutrition Policy and Programmes.

1. Basic concept of Food, Nutrition and Community health

- Definition of food, balanced diet, staple food, energy rich foods, body building foods, protective foods, nutrients, nutrition, malnutrition, undernutrition, overnutrition, health, community health and hygiene
- Understanding relationship between food, nutrition and health
- Functions of food: physiological, psychological and social
- Basic concept of a disease: epidemic, endemic, pandemic, acute and chronic, communicable and non-communicable, infectious, contagious and zoonotic diseases.
- Rate of a disease in a population: attack rate, mortality and morbidity rate, prevalence and incidence of a disease.

2. Nutrients Functions, dietary sources and clinical manifestations of deficiency/excess of the following nutrients:

- Carbohydrates, lipids and proteins
- Fat soluble vitamins - A, D, E and K
- Water soluble vitamins – Thiamine, riboflavin, niacin, pyridoxine, folate, Vitamin B12 and Vitamin C
- Minerals – calcium, iron and iodine

3. Nutritional importance of Food Groups

- Cereals, Pulses, Fruits and Vegetables, Milk and Milk products, Eggs, Meat, Fish

- Beverages: Tea, coffee, Fruit based beverages

4. **Public Health Nutrition and Diet Therapy:**

Epidemiology, prevalence, clinical features and preventive strategies of:

- Protein, Energy, Malnutrition (PEM), Vitamin A Deficiency (VAD), Iron Deficiency Anaemia (IDA), Iodine Deficiency Disorders (IDD), Fluorosis
- Epidemiology, risk-factors, prevalence, clinical features, preventive strategies and diet therapy of: Obesity, Hypertension and Coronary Heart Disease, Type 1 and Type 2 Diabetes Mellitus
- Epidemiology, risk-factors, prevalence, clinical features and preventive strategies and diet therapy of: GI Tract Disorders (Diarrhoea, Constipation), Liver (Infective Hepatitis)
- National Nutrition Policy and Programmes: Integrated Child Development Services (ICDS) Scheme, Mid-day Meal Programme (MDMP), National programmes for prevention of Anaemia, Vitamin A deficiency, Iodine Deficiency Disorders.

Suggested Readings:

- ❖ Mudambi, SR and Rajagopal, MV. Fundamentals of Foods, Nutrition and Diet Therapy; Fifth Edn; 2012; New Age International Publishers
- ❖ Mudambi, SR, Rao SM and Rajagopal, MV. Food Science; Second Edn; 2006; New Age International Publishers
- ❖ Srilakshmi B. Nutrition Science; 2012; New Age International (P) Ltd.
- ❖ Srilakshmi B. Food Science; Fourth Edn; 2010; New Age International (P) Ltd.
- ❖ Swaminathan M. Handbook of Foods and Nutrition; Fifth Edn; 1986; BAPPCO.
- ❖ Bamji MS, Rao NP and Reddy V. Text Book of Human Nutrition; 2009; Oxford & IBH Publishing Co. Pvt. Ltd.
- ❖ Wardlaw GM, Hampl JS. Perspectives in Nutrition; Seventh Edn; 2007; McGraw Hill.
- ❖ Lakra P, Singh MD. Text book of Nutrition and Health; First Edn; 2008; Academic Excellence.
- ❖ Manay MS, Shadaksharaswamy. Food – Facts and Principles; 2004; New Age International(P) Ltd.
- ❖ Potter NN, Hotchkiss JH. Food Science; Fifth Edn; 2006; CBS Publishers and Distributors.
- ❖ Sethi P and Lakra P. Aahaar Vigyaan, Poshan Evam Suruksha, Elite Publishing House, 2015
- ❖ Jain P et al. Poshan va swasthya ke mool siddhant (Hindi); First Edn; 2007; Academic Pratibha.
- ❖ Vrinda S. Aahaar Vigyan (Hindi); 2003; Shyam Prakashan
- ❖ Suri S. and Malhotra A. Food Science, Nutrition & Food Safety; Pearson India Ltd. 2014

SKILL ENHANCEMENT COURSE (SEC)

DIABETES AND DIABETES MANAGEMENT (Course Code: NUTR 1051)

[TOTAL CREDITS – 3 (THEORY - 2, TUTORIAL - 1)]

Course Outcome:

This course is designed to equip the students with the knowledge and skills necessary to provide high-quality care to diabetic patients. Students will learn about the diagnosis of diabetes, dietary advice for patients with diabetes, monitoring and management of diabetes, oral hypoglycaemics, insulin management and common problems encountered in the care of patients with diabetes. Upon completing the program, students will have a strong understanding of the diagnosis, management and care of patients with diabetes.

1. Etiologic classification of diabetes mellitus

- Type-1 Diabetes mellitus
- Type-2 Diabetes mellitus
- Other specific types of Diabetes
- Gestational Diabetes mellitus

2. Epidemiology and risk factors

- Reasons for increasing prevalence
- Major risk factors for type 2 diabetes mellitus

3. Pathophysiology and clinical features of Diabetes

- Normal insulin metabolism
- Pathogenesis of Type-1 Diabetes mellitus: Genetic susceptibility, autoimmunity and environmental factors
- Pathogenesis of Type-2 Diabetes mellitus: Genetic factors, Constitutional factors, Insulin resistance, Impaired insulin secretion, Increased hepatic glucose synthesis
- Clinical features of Type-1 and Type-2 Diabetes mellitus
- Contrasting features of type 1 and type 2 diabetes mellitus

4. Complications of Diabetes

Acute metabolic complications:

- Diabetic ketoacidosis (DKA)
- Hyperosmolar hyper glycaemic non-ketotic coma (HHS), Hypoglycaemia

Late systemic complications:

- Atherosclerosis
- Diabetic microangiopathy

- Diabetic nephropathy
 - Diabetic neuropathy
 - Diabetic retinopathy
 - Infections
- 5. Diabetic parameter (Principle of test, reference value, Interpretation):**
- Urinetesting: Glucosuria, Ketonuria
 - Blood sugar estimation (Fasting, PP, Random)
 - Oral glucose tolerance test
 - Glycosylated haemoglobin test
 - Insulin and C-peptide assay (ELISA)
- 6. Management of Diabetes:**
- Dietary and Lifestyle: Basic dietary guidelines and recommended diets in diabetes, Role of exercise
 - Drugs and insulin in the management of diabetes.
 - Dietary fibre and nutraceutical: Definition, classification and role.
 - Nutrition for the diabetic child
 - The Diabetes Prevention Programme (DPP)

Suggested readings:

- ❖ Gibney MJ, Elia M, Ljungqvist & Dowsett J. (2005) Clinical Nutrition. The Nutrition Society Text Book Series. Blackwell Publishing Company
- ❖ Gibson SR. (2005). Principles of Nutritional Assessment. 2nd Edn. Oxford University Press · Joshi YK. Basics of Clinical Nutrition. 2nd Edition. Jaypee Brothers Medical Publishers.
- ❖ Lee RD & Neiman DC. (2009). Nutritional Assessment. 5th Edn. Brown & Benchmark.
- ❖ Mahan L and Escott Stump S (2016) Krause's Food & Nutrition Therapy 14th ed. Saunders-Elsevier ·
- ❖ Shils ME, Shike M, Ross AC, Caballero B and Cousins RJ (2005) Modern Nutrition in Health and Disease. 10th edn. Lipincott, William and Wilkins.
- ❖ Williams SR (2001) Basic Nutrition and Diet Therapy. 11th edn. Times Mirror Mosby College Publishing

SEMESTER – II

MAJOR COURSE

NUTRITION IN PHASES OF HUMAN LIFE

(Code: NUTR 2011)

[TOTAL CREDITS: 4 (THEORY- 3, PRACTICAL - 1)]

Course Outcome:

This course deals with actual requirement of an individual throughout the normal life span. Students obtain knowledge about the importance of breast feeding and weaning in infancy, childhood, adolescence and adulthood. Understanding the importance of additional nutritional demand during pregnancy and lactation and dietary management of Athletes and old aged people is essential for formulating an adequate diet for them.

1. Concept and definition of terms:

- Growth, Development, Malnutrition and Health, Scope of Nutrition.
- Growth monitoring and promotion – Use of growth charts and standards, Prevention of growth faltering.

2. Minimum nutritional requirement and RDA:

- Formulation of RDA, dietary guidelines with reference to man and woman.

3. Nutrition during infancy:

- Breast feeding, Formula feeding, Weaning, Supplementary foods, Nutritional management of Preterm baby.

4. Nutrition for children:

- Diet in early childhood, elementary school age, high school age.

5. Nutrition for adult: Male and Female

6. Nutrition during pregnancy and lactation:

- Nutritional demands of Pregnancy, Food selection during Pregnancy, Complications of pregnancy and dietary management, Diet during Lactation.

7. Nutrition for athletes:

- Nutritional requirements and dietary management for sportsman and athletes, Meal planning for athletes, Carbohydrate loading

8. Geriatric nutrition:

- Planning of meals for older people, Nutrition of aged persons, Physiological complications in geriatric group and dietary

modifications required, Oxidative stress and aging and role of antioxidative nutrients for preventing aging.

9. Principles of meal planning:

- Food exchange list, Factors affecting meal planning and food related behavior.
- Dietary guidelines for Indians.

PRACTICAL:

1. Growth chart: Plotting and Interpretation using primary or secondary data in accordance with both ICMR and WHO Chart.
2. Clinical assessment and sign of nutrient deficiency disorders: Protein energy malnutrition (PEM), Anaemia, Rickets, Goiter, Vitamin A, Vitamin C and Vitamin B complex (Slide/Photography).
3. Diet survey in accordance with ICMR method (at least 3 days).

Suggested readings:

- ❖ Hoar WS (1984). General and comparative Physiology. 3rd edn. Prentice-Hall of India.
- ❖ Indian Council of Medical Research (2003). Nutrient Requirements and Recommended-Dietary Allowance for Indians. New Delhi.
- ❖ Sherwood L (2004). Human Physiology: From cells to systems. 5th edn. Thomson Brooks Cole.
- ❖ Swaminathan M (2009). Essentials of Foods and Nutrition, Vol - 1 and II. Ganesh and Co. Madras.
- ❖ Walker WA and Watkins JB (Ed.) (1985). Nutrition in Pediatrics, Boston, Little Brown & Co.
- ❖ WHO (1979). A growth chart for international use in Maternal and Children Health Care. Geneva.
- ❖ Wilson (1989). Anatomy and Physiology in Health and Illness. Edinburgh, Churchill Livingstone.

MINOR COURSE

HUMAN NUTRITION AND PHASES OF LIFE

(Course Code: NUTR 2021)

[TOTAL CREDITS: 4 (THEORY - 3, TUTORIAL - 1)]

Course Outcome:

This course deals with actual requirement of an individual throughout the normal life span. Students will obtain knowledge about importance of breast feeding and weaning in infancy, childhood, adolescence and adulthood. Understanding the importance of additional nutritional demand during pregnancy and lactation and dietary management of athletes and old aged people is essential for formulating adequate diets for them.

1. **Concept and definition of terms:**
 - Growth, Development, Malnutrition and Health, Scope of Nutrition.
 - Growth monitoring and promotion - Use of growth charts and standards, Prevention of growth faltering.
2. **Minimum nutritional requirement and RDA:**
 - Formulation of RDA, dietary guidelines with reference to man and woman.
3. **Nutrition during infancy:**
 - Breast feeding, Formula feeding, Weaning, Supplementary foods, Nutritional management of Preterm baby.
4. **Nutrition for children:**
 - Diet in early childhood, elementary school age, high school age.
5. **Nutrition for adult: Male and female**
6. **Nutrition during pregnancy and lactation:**
 - Nutritional demands in Pregnancy, Food selection during Pregnancy, Complications of pregnancy and dietary management, Diet during Lactation.
7. **Nutrition for athletes:**
 - Nutritional requirements and dietary management for sportsman and athletes, Meal planning for athletes, Carbohydrate loading
8. **Geriatric nutrition:**
 - Planning of meals for older people, Nutrition of aged persons, Physiological complications in geriatric group and dietary modifications required, Oxidative stress and aging and role of antioxidative nutrients for preventing aging.
9. **Principles of meal planning:**
 - Food exchange list, Factors affecting meal planning and food related behavior.
 - Dietary guidelines for Indians.

Suggested readings:

- ❖ Hoar WS (1984). General and comparative Physiology. 3rd edn. Prentice-Hall of India.
- ❖ Indian Council of Medical Research (2003). Nutrient Requirements and Recommended - Dietary Allowance for Indians. New Delhi.
- ❖ Sherwood L (2004). Human Physiology: From cells to systems. 5th edn. Thomson Brooks Cole.
- ❖ Swaminathan M (2009). Essentials of Foods and Nutrition, Vol - I and II. Ganesh and Co. Madras.
- ❖ Walker WA and Watkins JB (Ed.) (1985). Nutrition in Pediatrics, Boston, Little Brown & Co.
- ❖ WHO (1979). A growth chart for international use in Material and Children Health Care. Geneva.
- ❖ Wilson (1989). Anatomy and Physiology in Health and Illness. Edinburgh, Churchill Livingstone.

INTERDISCIPLINARY/MULTIDISCIPLINARY COURSE
(IDC/MDC)

MATERNAL NUTRITION

(Course Code: NUTR 2031)

[TOTAL CREDITS: 3 (THEORY - 2, TUTORIAL - 1)]

Course Outcome:

Students will have sound knowledge on healthy diets of Indian Pregnant women and key nutrients during pregnancy. Students will be able to identify nutrition-related health issues among females of reproductive age that can affect their ability to conceive and that affect maternal and foetal outcomes of pregnancy. They will be able to describe appropriate weight gain for women during pregnancy including total and rate of gain as well as promising practices for achieving an appropriate gestational weight gain. The students will be able to identify the role of nutrition in preventing and treating nutrition – related issues during pregnancy, such as, gestational diabetes, hypertensive disorders and iron deficiency anaemia.

1. Health Care during Pregnancy:

- Pregnancy trimester and hormonal regulation
- Growth of foetus
- Antenatal Care - Meaning and Purpose
- Psychological and Physiological changes (fluid balance, circulatory, respiratory, digestive, urinary, skeletal, skin and reproductive system changes, weight gain) during pregnancy
- Immunization during pregnancy

2. Health Issues and Advice:

- Physiological complications during pregnancy, Ectopic pregnancy
- Sign and symptoms: Morning sickness, Backache, Varicose veins, Leg cramps, Palpitation, Shortness of breath, Constipation, Itching in the genital area, Swollen hands and feet, Mood extremes
- Gestational diabetes, Pregnancy induced hypertension (PIH), Thyroidism
- Toxoplasmosis
- Women with alcohol or drug addiction or eating disorders

3. Anaemia in Pregnancy

- Nutritional Anaemia - Iron, Folic acid and Vitamin B₁₂ deficiency anaemia
- Parasitic Infestation, Sickle cell anaemia and Thalassemia
- Consequences of anaemia, Prevention - Therapeutic and Govt. Initiatives (Supplementary Feeding)

4. Nutrition for pregnant and Nursing Mother:

- Physiology of Pregnancy and lactation
- Nutritional demands, RDA
- Food selection during Pregnancy and Lactation
- Dietary management and meal planning
- Low-cost nutritional diet planning

5. Family planning and maternal health:

- Concept of family planning, Health aspect of family planning
- Contraceptive methods (Concept, Advantages and disadvantages): Spacing methods (Barrier, IUD, Hormonal, Post-conceptual), Terminal method (Male sterilization, Female sterilization)

6. Maternal nutrition policies and programmes.

Suggested Readings:

- ❖ Wadhwa A and Sharma S (2003). Nutrition in the Community – A Textbook. Elite Publishing House Pvt. Ltd. New Delhi.
- ❖ Park K (2011). Park's Textbook of Preventive and Social Medicine, 21st Edn. M/s Banarasidas Bhanot Publishers, Jabalpur, India.
- ❖ Bamji MS, Krishnaswamy K and Brahmam GNV (Eds) (2009). Textbook of Human Nutrition, 3rd edn. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.

SKILL ENHANCEMENT COURSE (SEC)

PATHOLOGY AND LABORATORY TECHNIQUES

(Course Code: NUTR 2051)

[TOTAL CREDITS -3 (THEORY - 2, TUTORIAL - 1)]

Course outcome:

In this course, the students will be introduced to the fundamental concepts of basic medical laboratory technology and the career opportunities available in this field. This course provides an insight to the students regarding various issues associated with laboratory works like investigation of bio-fluids, analysis of blood smear etc. and building up goodwill and reputation of Laboratory or Hospitals with the essential concepts of medical diagnostics. Students will be able to develop practical understanding with basic medical laboratory techniques. They will be provided a brief insight about personal grooming and its stages, meaning and importance of knowledge of Laboratory base works and other key dimensions of laboratory management in Hospitals.

- 1. Cellular Adaptations, Cell Injury and Cell Death:**
 - Causes and mechanisms of cell injury.
 - Brief concept of cellular responses: Hyperplasia, Hypertrophy, Atrophy, Metaplasia, Necrosis, Apoptosis.
- 2. Hemodynamic Pathology:**
 - Brief concept on Edema, Hyperaemia, Haemorrhage, Haemostasis and Thrombosis.
- 3. Cell proliferation and Cancer:**
 - Characteristics of benign and malignant neoplasms, grading and staging of cancer (Inbrief).
- 4. Pathology of Urine:**
 - Physical characteristics - Color, transparency, pH and specific gravity.
 - Chemical characteristics - Protein, Sugar, Ketone bodies, Bile.
 - Microscopic features - RBC, Epithelial cell, Pus cells, Casts and Crystals.
- 5. Analysis of Blood (Principle, Technique, Reference value and Clinical significance):**
 - Preparation of Blood smear
 - Differential Leucocyte Count (D.L.C.) using Leishman's stain
 - TC of RBC, WBC and Platelet using haemocytometer
 - Erythrocyte Sedimentary Rate (E.S.R.), Packed Cell Volume (P.C.V.)
- 6. Diagnosis of Hypertension and Cardio-vascular diseases (CVDs)**
 - Determination of Blood pressure and ECG
- 7. Techniques for diagnosis of communicable Diseases**
 - Tuberculosis (Ziehl-Neelsenacid-fast staining method)

- Malaria (Microscope based and ELISA based) and Dengue
- 8. **Clinical Biochemistry(Principle, Reference value and Clinical significance)**
 - Liver Function Tests (LFTs), Renal function Test (RFTs), Lipid profiling
- 9. **Medical imaging:**
 - Basic principle and applications of X-Ray, Ultrasonography, MRI and CT scan

Suggested readings:

- ❖ Robbins and Cotran Pathologic Basis of Disease, 8th edition (2009), Vinay Kumar, Abul K Abbas, Jon C Aster, Nelson Fausto; Saunders Publishers, ISBN-13: 978-1416031215.
- ❖ General and Systematic Pathology, 2nd edition (1996), Ed. J Underwood and JCE Underwood; Churchill Livingstone, ISBN-13:978-0443052828.
- ❖ Robbins Basic Pathology, 9th edn. (2012), Kumar, Abbas, Fausto and Mitchell; Saunders Publication, ISBN-13:978-1437717815.
- ❖ Medical Laboratory Technology Methods and Interpretations Volume 1 and 2, 6th edn. (2009), Ramnik Sood; Jaypee Brothers Medical Publishers, ISBN-13: 978-8184484496