

**Mahatma Gandhi University**

**SYLLABUS FOR  
B. Sc CLINICAL NUTRITION AND DIETETICS**

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## **B. Sc CLINICAL NUTRITION AND DIETETICS**

Nutrition plays a primary role in growth, development, health and fitness. Maintaining appropriate nutrition throughout life can prevent, or at least delay the onset of nutrition related diseases. The U.G programme in clinical nutrition and dietetics offers a thorough study of the field of nutrition and dietetics giving special attention to the clinical aspects. An integration of theory, practical, internship and community work aim at equipping the students the necessary proficiencies for a wide variety of carriers.

### **CARRIER OPTIONS**

1. Dietitians in hospitals
2. Diet consultants in hotels industrial canteens etc
3. Nutritionist in food industries
4. Member of teaching faculty in higher education
5. Research assistants/ Associate in institutes undertaking research programmes in nutrition and health
6. Food quality controllers in food processing units.
7. Project officers under different welfare programmes of governmental and non - governmental organizations
8. Project officers in nutrition programmes FAO, WHO, UNICEF
9. Self employment opportunities

### **ELIGIBILITY**

+2 or equivalent with any three of the following science subject, physics, chemistry, biology, home science. Selection will be based on academic excellence

## EVALUATION

The evaluation of each course shall contain two parts.

- (i) Internal or In-Semester Assessment (ISA)
- (ii) External or End-Semester Assessment (ESA)

The internal external assessment ratio shall be 1:3

The Internal and External examinations shall be evaluated using direct Grading system based on 5 point scale as given below.

Letter Grade	Performance	Grade point (G)	Grade Range
A	Excellent	4	3.5 to 4.00
B	Very good	3	2.5 to 3.49
C	Good	2	1.5 to 2.49
D	Average	1	0.5 to 1.49
E	Poor	0	0.00 to 0.49

The overall grade for a programme for certification shall be based on CGPA with a point scale give below.

CGPA	Grade
3.80 to 4.00	A+
3.50 to 3.79	A
3.00 to 3.49	B+
2.50 to 2.99	B
2.00 to 2.49	C+
1.50 to 1.99	C
1.00 to 1.49	D

A separate minimum of D grade for internal and external are required for a pass for a course. For a pass in a programme a separate minimum of Grade D is required for all the courses and must score a minimum CGPA of 2.00 or an overall grade C+ and above.

Internal evaluation: is to be done by continuous assessments on the following components.

Components of the internal evaluation and their weights are as below.

(i) Theory

Component	Weight
Attendance	1
Assignment	1
Seminar	1
Two test papers	2

Attendance

% age of attendance	Grade
> 90%	A
Between 85 and 90	B
Between 80 and 85	C
Between 75 and 80	D
< 75	E

Assignments : Best two assignments are considered per course.

Seminar/Viva : The student has to take a minimum of 1 seminar per course.

Class test : A minimum of 2 class tests are to be attended. The grades of best 2 test are to be taken.

## Semester I

Course Title	Hours/Week	Credit	Total Credit
English I	5	4	20
Core course I- Human Anatomy and Physiology -I	4	4	
Core course II - Basic Nutrition and Dietetics	4	3	
Core course III - Information Technology and IT tools	4	3	
I Complementary Paper I Chemistry	2	2	
I Complementary Paper I – Practical	2	1	
II Complementary Paper I Zoology	2	2	
II Complementary Paper I – Practical	2	1	

## SEMESTER I

### CORE COURSE I- HUMAN ANATOMY AND PHYSIOLOGY –I

Total hours of instruction: 54

Hours/week : 4

Credit: 4

Objectives:

To enable the students to-

- Understand the general structure and functions of various systems and organs of the body.
- Understand the abnormal changes in the tissue and organs on several disease states.

#### Module I

##### A. Circulatory System

Functions: Blood –functions, composition, blood clotting, blood groups, blood vessels, structure of heart, cardiac cycle, blood circulation. ECG and its significance, blood pressure – pulse, systolic and diastolic. Anaemia, Leukemia, Varicose veins, Angina pectoris.

References:

Wilson, J. K and Waugh, A. (1999) Ross & Wilson- Anatomy and Physiology in health and illness, Pp: 56-110.

Sebastian, M. M (2001) Animal Physiology, Madonna Books, Amalagiri P. O, Kottayam, Pp:140-153.

Chatterjee, C. C (2003) Human Physiology, Medical Allied Agency, 82/1, Mahatma Gandhi Road, Calcutta. Pp:122-186, 226-299.

Hole, J .W.(1989), Essentials of Human Anatomy and Physiology, 3<sup>rd</sup> edition, WCB Publishers, Dubuque, Iowa, Pp:360-422.

## B. Lymphatic System

Functions, formation of Lymph, lymph glands and its functions, Spleen- Structure and function. Oedema and its types.

### References

- Wilson, J. K. and Waugh A (1999) Ross & Wilson- Anatomy and Physiology in health and illness, Pp130-135
- Sebastian, M. M (2001) Animal Physiology, Madonna Books, Amalagiri P O, Kottayam, Pp:170-172.
- Chatterjee, C. C (2003) Human Physiology, Medical Allied Agency, 82/1, Mahatma Gandhi Road, Calcutta. Pp:192-203.
- Hole, J. W. (1989), Essentials of Human Anatomy and Physiology, 3<sup>rd</sup> edition, WCB Publishers, Dubuque, Iowa, Pp:432-439.

## Module II

### Digestive System

Digestive organs- Structure and function, glands-liver, pancreas, gall bladder, gastric glands, intestinal glands and salivary glands. Digestive disorders- vomiting, constipation, diarrhoea, abdominal pain, ulcers and piles.

### References

- Wilson, J. K. and Waugh A (1999) Ross & Wilson- Anatomy and Physiology in health and illness, Pp:280-310.
- Sebastian M M (2001) Animal Physiology, Madonna Books, Amalagiri P O, Kottayam, Pp:49-72.
- Chatterjee C C (2003) Human Physiology, Medical Allied Agency, 82/1, Mahatma Gandhi Road, Calcutta. Pp: 427-497.
- Hole J. W, (1989), Essentials of Human Anatomy and Physiology, 3<sup>rd</sup> edition, WCB Publishers, Dubuque, Iowa, Pp: 304-327.

### **Module III**

#### Nervous System

Structure of nerve cell, nerve fiber. Classification of nervous system – CNS, PNS , ANS – their functions. Nerve impulses, synapse, reflex action, voluntary action.

#### References

- Wilson, J. K. and Waugh A (1999) Ross & Wilson- Anatomy and Physiology in health and illness, Pp:142-175
- Sebastian, M. M (2001) Animal Physiology, Madonna Books, Amalagiri P O, Kottayam, Pp:239-259.
- Chatterjee, C. C (2003) Human Physiology, Medical Allied Agency, 82/1, Mahatma Gandhi Road, Calcutta. Pp:5.1-5.177.
- Hole, J. W (1989), Essentials of Human Anatomy and Physiology, 3<sup>rd</sup> edition, WCB Publishers, Dubuque, Iowa, Pp: 206-239.

### **Module IV**

#### Sense Organs

##### A: Skin

Structure and functions. Disorders of skin – dandruff, dermatitis and burns.

#### References

- Wilson, J. K. and Waugh A (1999) Ross & Wilson- Anatomy and Physiology in health and illness, Pp:13.
- Chatterjee C C (2003) Human Physiology, Medical Allied Agency, 82/1, Mahatma Gandhi Road, Calcutta. Pp:1.68-1.78.

##### B: Eye

Structure and functions. Physiology of vision, defects in vision – myopia and hypermetropia. Common eye diseases – conjunctivitis, trachoma, cataract.

## References

Wilson, J. K. and Waugh A (1999) Ross & Wilson- Anatomy and Physiology in health and illness, p196-208.

Hole J W, (1989), Essentials of Human Anatomy and Physiology, 3<sup>rd</sup> edition, WCB Publishers, Dubuque, Iowa, Pp;261-269.

C: Ear

Structure and functions –mechanism of hearing, common ear diseases- deafness, Vertigo, Motion Sickness.

## References

Wilson, J. K. and Waugh A (1999) Ross & Wilson- Anatomy and Physiology in health and illness, Pp: 192-196.

Hole J W, (1989), Essentials of Human Anatomy and Physiology, 3<sup>rd</sup> edition, WCB Publishers, Dubuque, Iowa, Pp; 255-261.

D: Nose

Structure and functions. – Olfactory Mechanism.

## References

Ross & Wilson- Anatomy and Physiology in health and illness, p207-208.

Sebastian M M (2001) Animal Physiology, Madonna Books, Amalagiri P O, Kottayam, Pp:259-286.

Chatterjee C. C (2003) Human Physiology, Medical Allied Agency, 82/1, Mahatma Gandhi Road, Calcutta. Pp:6.6-6.12.

Hole, J. W, (1989), Essentials of Human Anatomy and Physiology, 3<sup>rd</sup> edition, WCB Publishers, Dubuque, Iowa, Pp; 252.

E: Tongue

Structure and functions– Gustatory Mechanism.

## References

Chatterjee, C .C (2003) Human Physiology, Medical Allied Agency, 82/1, Mahatma Gandhi Road, Calcutta. Pp: 6.1-6.5.

Hole, J W, (1989), Essentials of Human Anatomy and Physiology, 3<sup>rd</sup> edition, WCB Publishers, Dubuque, Iowa, Pp: 253-254.

## Suggested Readings

- Wilson, J. K. and Waugh A (1999) Ross & Wilson- Anatomy and Physiology in health and illness.
- Sebastian, M. M (2001) Animal Physiology, Madonna Books, Amalagiri.
- Chatterjee, C. C (2003) Human Physiology, Medical Allied Agency, 82/1, Mahatma Gandhi Road, Calcutta.
- Hole, J. W (1989), Essentials of Human Anatomy and Physiology, 3<sup>rd</sup> edition, WCB Publishers, Dubuque, Iowa.

## INTERNAL EVALUATION

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER I

### CORE COURSE II – A. BASIC NUTRITION

Total hours of instruction: 54

Credit: 3

Hours per week: 4

#### Objectives

To enable the students to-

- To understand the relation between nutrition and health.
- To acquire knowledge about the main nutrients and its functions in the body.
- To understand the modifications in nutrient and dietary requirement for various diseases.

#### Module I

Introduction to nutrition, Definitions: -Food, Nutrition, Health, Nutrients, Nutritional status, optimum and good nutrition, states of nutritional Health:- Under nutrition and over nutrition.

Functions of food, Food as a source of nutrients.

#### Reference

Mudambi,S.R, Rajagopal, M.V(1990),Fundamentals of Food and Nutrition, Wiley Eastern Ltd, Pp:4-9

Srilakshmi,,B(2006),Nutritional Science,3rd Edition, New Age International (p) Limited,Pp:1-9.

#### Module II

Visible symptoms of good health, Food guide, How to use food guide, and Basic five food groups.

## References

Wardlad, G.M. Insel, P.M (1993), Perspectives in Nutrition, Second edition, Mosby Publishers, Pp: 43-45

## Module III

Use of food in body-digestion, absorption, transport and utilization of nutrients in the body.

## Reference

Mudambi, S.R, Rajagopal,M.V(1990),Fundamentals of Food and Nutrition, Wiley Eastern Ltd, Pp:4-9

## Module IV

Water as a nutrient, functions, sources, requirements, Water balance:-Water intake and loss, Water intoxication and dehydration

## Reference

Swaminathan,S(2002), Food and Nutrition Volume I,The Bangalore Printing and Publisghing Co.Ltd, Pp:432-436.

## Module V

Carbohydrates: - Composition, Classification, Sources and functions.

## References

Robinson, C.H, Lawler M.R, Cheweth W.L; and Gaswick A.E, Normal and Therapeutic Nutrition ,17<sup>th</sup> edition,Mac Milan Publishers,Pp:64-68.

## Module VI

Fat and oils: Composition, Classification, food sources, requirements, functions.

## Module VII

Protein: Composition, classification, functions, sources, requirements.

## Module VIII

Energy: Unit of energy, Source of energy, B.M.R:- Definitions, factors affecting metabolic rate.

## **Module IX**

Minerals: Functions, sources, requirements, deficiency (very brief) of following minerals: calcium, Iron, Iodine, sodium, potassium

## **Module X**

Vitamins:- Functions, sources, requirements, deficiency (very brief) , fat soluble vitamins A, D, E, K and water soluble vitamins Thiamin, Riboflavin, Niacin, Vitamin C.

### **Suggested Readings (Basic Nutrition)**

- Bamji M.S, Vinodini Reddy (1998), Text Book of Human Nutrition, Oxford and IBH publishing Co. Ltd New Delhi.
- Food and Nutrition (1996), Education planning, Arya publishing House.
- Guthrie H.A, Picciano M.F, (1995), Human Nutrition, Mosby, St. Louies Missionary.
- Joshi V.D (1999), Hand book of Nutrition and dietetics, Vora medical publications.
- Khader V.J, (2003), Foods, Nutrition and Health, Kalyani Publishers.

## **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## **CORE COURSE II – B BASIC DIETETICS**

### **Module 1**

Role of dietitian: - Hospital and community.

#### **Reference:**

Srilakshmi B, Dietetics (2006), New age International publishing Ltd,  
327-329.

### **Module II**

Basic concepts of Diet Therapy

### **Module III**

Therapeutic adaptations of normal diet

#### **Reference**

Srilakshmi B, Dietetics (2006), New age International publishing Ltd,  
Pp: 141,151-158

### **Module IV**

Routine hospital diets - regular diets, clear fluid diet, full fluid diet, soft diet  
and tube feeding.

#### **Reference**

Robinson C.H., Lawler M..R, Cheweth W.L; and Gaswick A.E,Normal and  
Therapeutic Nutrition ,17<sup>th</sup> edition, Mac Milan Publishers, Pp: 410-415

### **Module V**

Nutrition and diet clinic – patient check up and dietary counseling, n of the  
patient and follow up.

#### **Suggested Readings**

- Antia P. Clinical Dietetics and Nutrition, 2<sup>nd</sup> edition, Oxford university press
- Garrow J.S, James W. P.T, Ralph A, (2000), Human Nutrition and Dietetics, 10<sup>th</sup> edition, Churchill Livingston, London

- Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis missionery.
- Sharon M (1994), Complete Nutrition, Avery publishing group. New York.
- Mohan K. L, Krause M.V (2002), 2<sup>nd</sup> edition Food , nutrition and Diet Therapy, W.S. suders Co, Philadelphia.

## **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## **SEMESTER I**

### **CORE COURSE III - INFORMATION TECHNOLOGY AND IT TOOLS**

Total hours of instruction: 54

Credit: 3

Hours per week: 4

#### **Objectives:**

- It will provide an introduction to Information Technology and IT tools. It makes one to become IT literate.
- It helps to understand and work with Operating systems and Microsoft Office Packages.
- It helps to effectively use the Internet for both information retrieval and data transfer.

#### **Module 1**

##### **Computer Fundamentals**

Computer Organization, Characteristics of computers, Input Devices, Output Devices, Primary memory and Secondary memory, Hardware and Software, Types of computers, Computer Languages.

#### **Reference**

P. K. Sinha and Priti Sinha, Computer Fundamentals, BPB Publications, New Delhi, 3<sup>rd</sup> edition. 2, 15-19, 97-135,139-164,196-220,362-369.

#### **Module II**

##### **Operating Systems**

Operating system, Booting, An overview of MS DOS and Microsoft

Windows operating systems

MS DOS – Internal Vs. External DOS commands, Simple Internal commands - file operations, Directory related commands, Simple External commands

MS Windows – Basic Windows elements – Desktop, Start menu, Control Panel (Date/Time, Display, Mouse, Keyboard, Regional Settings). Using essential accessories – Paint, Notepad, Word Pad, and Calculator.

#### References

P. K. Sinha and Priti Sinha, Computer Fundamentals, BPB Publications, New Delhi, 3<sup>rd</sup> edition. Pp:237-245,257,258.

Steve S (2003) Microsoft Office for Windows Pearson education, Singapore, Pp: 3-10'

MS DOS 6.2 Quick Reference – Rajiv Mathur

#### Module III

Internet and E-mail

Computer Networks – LAN, MAN, WAN. Internet requirements, TCP/IP, Internet services, Search Engines, Understanding Internet address, E-mail.

#### Reference

P. K. Sinha and Priti Sinha, Computer Fundamentals, BPB Publications, New Delhi, 3<sup>rd</sup> edition. Pp:306-347.

#### Module IV

Word Processing and Spreadsheet Packages

*Microsoft Word* – Basic operations, Finding and replacing text, Headers and Footers, Formatting text, creating and printing Merged documents, running Macros, Table operations.

*Microsoft Excel* – Spreadsheet concepts, Basic operations, Working with Charts, Formatting worksheets, Functions - Mathematical, Logical,

Statistical, Text and Date and Time functions, Goal Seek, Scenarios,  
Auditing, Important Data menu commands.

#### Reference

Dinesh Maidasani, MS Office 2000, Firewall Media, Lakshmi publications,  
New Delhi. Pp:37-92,99-169.

Steve Sagman, Microsoft Office for Windows, Pp:33-3-104,115-192.

#### Suggested Readings

- Dinesh Maidasani, MS Office 2000, Firewall Media, Lakshmi publications,  
New Delhi.
- Steve Sagman, Microsoft Office for Windows.
- P. K. Sinha and Priti Sinha, Computer Fundamentals, BPB Publications,  
New Delhi, 3<sup>rd</sup> edition.
- Steve S (2003) Microsoft Office for Windows Pearson education,  
Singapore.
- MS DOS 6.2 Quick Reference – Rajiv Mathur

#### INTERNAL EVALUATION

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## Semester II

<b>Course Title</b>	<b>Hours/Week</b>	<b>Credit</b>	<b>Total Credit</b>
English II	5	4	20
Core course IV- Human Anatomy and Physiology II	4	4	
Core course V – Therapeutic Nutrition	4	3	
Core course VI - Programming Through C Language	4	3	
I Complementary Paper II	2	2	
I Complementary Paper II– Practical	2	1	
II Complementary Paper II	2	2	
II Complementary Paper II – Practical	2	1	

## SEMESTER II

### CORE COURSE IV – HUMAN ANATOMY AND PHYSIOLOGY II

Total Hours of Instruction: 72

Credit: 4

Hours/Week : 4

#### Objectives:

To enable the students to-

- Understand the general structure and functions of various systems and organs of the body.
- Understand the abnormal changes in the tissue and organs on several disease states.

#### Module I

##### Respiratory system

Organs of respiration – structure and functions, volume and capacity of lungs, mechanism of respiration , cell respiration. Respiratory diseases – T.B, asthma, pleurisy, cough and hiccups.

#### References

Hole, J.W (1989) , Essentials of Human Anatomy and Physiology , 3<sup>rd</sup> edition , WCB publishers , Dubuque , Iowa. – Pp 344-360

Wilson , K.J. and Waugh , A. (1999) , Ross and Wilson Anatomy and Physiology in health and illness. – Pp 240-257

Sebastian ,M.M (2001), Animal Physiology , Madonna Books , Amalagiri Kottayam– Pp 117-134

Chatterjee, C.C. (2003), Human Physiology , Vol I & II Medical Allied Agency , 82/1 , Mahatma Gandhi Road , Kolkata – 700009. – Pp 365-425

## **Module II**

Excretory system

Excretory organs – structure and functions. Formation of urine, composition of normal urine, abnormal constituents of urine, significance of urine examination. Diseases – Nephritis, Nephrosis, Renal stone.

## **References**

Hole, J.W (1989) , Essentials of Human Anatomy and Physiology , 3<sup>rd</sup> edition , WCB publishers , Dubuque , Iowa. – Pp 452-466

Wilson, K.J. and Waugh , A. (1999) , Ross and Wilson Anatomy and Physiology in health and illness. – Pp 338-347

Sebastian,M.M (2001), Animal Physiology , Madonna Books , Amalagiri Kottayam– Pp 178-195

Sarada Subramanyam. S, Text book of Human Physiology, S Chand and Company Ltd, New Delhi, p-411-445.

Chatterjee, C.C. (2003), Human Physiology , Vol I & II Medical Allied Agency, 82/1 , Mahatma Gandhi Road , Kolkata Pp. 1-1-156

## **Module III**

Endocrine system

Endocrine glands – structure and functions

a) Pituitary b) Thyroid c) Parathyroid d) Adrenal e) Pancreas

Disorders of over and under secretions.

## References

- Hole, J.W (1989), Essentials of Human Anatomy and Physiology , 3<sup>rd</sup> edition , WCB publishers , Dubuque , Iowa. – Pp 278-294
- Wilson, K.J. and Waugh , A. (1999) , Ross and Wilson Anatomy and Physiology in health and illness. – Pp 216-235
- Sebastian ,M.M (2001), Animal Physiology , Madonna Books, Amalagiri Kottayam– Pp 289-301
- Chatterjee II , C.C. (2003), Human Physiology , Vol I & II Medical Allied Agency , 82/1 , Mahatma Gandhi Road , Kolkata – 700009. 4-13-4-176

## Module IV

### Reproductive system

Male reproductive organs – structure, and functions. Female reproductive organs- structure and functions, reproductive hormones, menstruation, puberty, menopause, fertilization, development of fertilized ovum, placenta and its functions, parturition.

## References

- Wilson, K.J. and Waugh , A. (1999) , Ross and Wilson Anatomy and Physiology in health and illness. – Pp: 422-435
- Sebastian ,M.M (2001), Animal Physiology , Madonna Books , Amalagiri Kottayam– Pp: 302-303, 310-331
- Chatterjee, C.C. (2003), Human Physiology , Vol I & II Medical Allied Agency , 82/1 , Mahatma Gandhi Road , Kolkata – 700009.Pp: 4-203 -4- 285
- Hole, J.W (1989), Essentials of Human Anatomy and Physiology , 3<sup>rd</sup> edition , WCB publishers , Dubuque , Iowa. – Pp 490-510.

## **Module V**

### Skeletal system

A general account of axial skeleton and appendicular skeleton.

#### References:

Hole, J.W (1989) , Essentials of Human Anatomy and Physiology , 3<sup>rd</sup> edition , WCB publishers , Dubuque , Iowa. – Pp 136-153.

## **Module VI**

### Muscular system

General account of the system, types of muscles – striated, non-striated, muscle contraction.

#### References

Sebastian ,M.M (2001), Animal Physiology , Madonna Books , Amalagiri Kottayam– Pp 212-225

Hole, J.W (1989) , Essentials of Human Anatomy and Physiology , 3<sup>rd</sup> edition , WCB publishers , Dubuque , Iowa. Pp 168-179

#### **Suggested Readings:**

- Ascend Publications Human Anatomy (2006) ,Nagampadom ,Kottayam-6
- Chatterjee, C.C. (2003), Human Physiology , Vol I & II Medical Allied Agency, 82/1, Mahatma Gandhi Road , Kolkata – 700009.
- Gyton and Hall (2000),Text book of Medical Physiology , 10<sup>th</sup> edition , Harcourt Asia PTE LTD Singapore
- Hole, J.W (1989) , Essentials of Human Anatomy and Physiology , 3<sup>rd</sup> edition , WCB publishers , Dubuque , Iowa.
- Sebastian ,M.M (2001), Animal Physiology , Madonna Books , Amalagiri Kottayam

- Subramanyam , S , Madavankutty , K and singh , H.D (2001) Text book of Human Physiology, S. chand and Co. Ltd , Ramnagar , New Delhi – 110055.
- Wilson , K.J. and Waugh , A. (1999) , Ross and Wilson Anatomy and Physiology in health and illness.

### **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER II

### CORE COURSE V - THERAPEUTIC NUTRITION

Total Hours of Instruction: 54

Credit: 3

Hours/ week: 4

Objectives

To enable the students to-

- Develop ability to plan balanced diet for various activity group and various socio economic levels.
- To learn how to plan and prepare diet for various diseases.

#### **Module I**

Modification of diet – fever, metabolism in fever, general dietary consideration'

Reference

Srilakshmi B, Dietetics (2006), New age International publishing Ltd, Pp. 167-170

#### **Module II**

Diet in gastrointestinal disease- Aetiology, Symptoms and dietary management of constipation, diarrhoea and peptic ulcer

#### **Module III**

Diet in Cardiovascular diseases - Aetiology, symptoms and dietary management of Atherosclerosis, Hypertension.

Reference

Bamji M.S and Reddy V (1998), Text Book of Human Nutrition, ford and IBH publishing Co. Ltd New Delhi. Pp- 341-350

#### **Module IV**

Diet in Diabetes mellitus– Aetiology, symptoms, types and dietary modifications.

## Reference

Garrow J.S, James W. P.T and Ralph A, (2000), Human Nutrition and Dietetics, 10<sup>th</sup> edition, Churchill Livingstone, London. Pp 521-533

## Module V

Diet in obesity and Leanness – Types causes, dietary modifications complications.

### Reference

Gibney, M.J, Dinald A and Helon M.R,(2004) Nutrition & metabolism, Blaclawill publishing Pp: 321-333

## Module VI

Diet in renal disease- Nephritis, Nephrosis, acute and chronic renal feature, renal calculi, dialysis. Causes, symptoms and dietary management.

## Module VII

Feeding the patient – Psychology of feeding the patient

### Reference

Robinson C.H, Lawler M.R, Cheweth W.L; and Gaswick A.E, (1986) Normal and Therapeutic Nutrition ,17<sup>th</sup> edition, Mac Milan Publishers, Pp 395-400.

## Suggested Readings

- Mohan K. L, Krause M.V (2002), 2<sup>nd</sup> edition Food , nutrition and Diet Therapy, W.S. suders Co, Philadelphia.
- Antia P. Clinical Dietetics and Nutrition, 2<sup>nd</sup> edition, Oxford university press
- Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis missionery.
- Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.

- Garrow J.S, James W. P.T, Ralph A, (2000), Human Nutrition and Dietetics, 10<sup>th</sup> edition, Churchill Livingstone, London

## **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER II

### CORE COURSE VI - PROGRAMMING THROUGH 'C' LANGUAGE

Total hours of Instruction: 54

Credit:3

Hours/Week: 4

Objectives:

- To make the student to develop efficient algorithms and flowcharts for solving a problem
- To understand programming and solving problems using 'C'.

#### Module 1

Introduction to Programming

Algorithms, Flowcharts, Introduction to Programming

Reference

P. K. Sinha and Priti Sinha, Computer Fundamentals, BPB Publications, New Delhi, 3<sup>rd</sup> edition.

Balagurusamy, E., (2002) Programming in ANSI C, Edition 2.1, Tata McGraw – Hill Publishing company Ltd, New Delhi,

#### Module II

Introduction to 'C' Language

Importance of C, Basic structure of C Programs, Executing a C program

Constants, Variables and Data Types

Operators and Expressions, Basic input/output statements

References

Balagurusamy, E., (2002) Programming in ANSI C, Edition 2.1, Tata McGraw – Hill Publishing company Ltd, New Delhi.

### **Module III**

Decision Making, Branching and Looping

Decision making with IF statement, The IF-ELSE statement, Nesting of IF-ELSE statements, The ELSE IF ladder, The switch statement

Loops: *while* loop, *do while* loop, *for* loop, Nested loops, Jumps in loops

#### References

Balagurusamy, E., (2002) Programming in ANSI C, Edition 2.1, Tata Mc Graw – Hill Publishing company Ltd, New Delhi.Pp:99-142.

### **Module IV**

Arrays

One-dimensional arrays, Array manipulations, Two-dimensional arrays, Initializing arrays, Null terminated Strings as array of characters, Multidimensional arrays

#### References

Balagurusamy, E., (2002) Programming in ANSI C, Edition 2.1, Tata Mc Graw – Hill Publishing company Ltd, New Delhi.

### **Suggested Readings**

Balagurusamy, E., (2002) Programming in ANSI C, Edition 2.1, Tata Mc Graw – Hill Publishing company Ltd, New Delhi.

P. K. Sinha and Priti Sinha, Computer Fundamentals, BPB Publications, New Delhi, 3<sup>rd</sup> edition.

Kanetkar, Y(2005) Let Us C, BPB Publications New Delhi.

### **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

### Semester III

Course Title	Hours/Week	Credit	Total Credit
Core Course – VII – Advanced Dietetics	4	4	20
Core Course VIII – Food Microbiology	4	3	
Core Course IX – Sanitation and Hygiene	4	3	
Core Course X – Practical Advanced Dietetics – I	3	2	
I Complementary Paper	3	3	
I Complementary Practical	2	1	
II Complementary Paper	3	3	
II Complementary Practical	2	1	
Job Training – Dairy Training	-	-	

## SEMESTER III

### CORE COURSE VII - ADVANCED DIETETICS

Total hours of instruction – 72

Credit – 4

Hours / Week : 4

#### Objectives

- To understand skills and techniques in the planning and preparation of therapeutic diet for various diseases and nutritional deficiencies.
- To gain knowledge in diet counselling and educating patients
- To understand the classification, diagnosis, aetiology, symptoms and dietetic management of various diseases.

#### Module I

- a) Pre and post operative diet, tube feeding, parenteral nutrition, IV feeding (intravenous feeding).

#### References

Charles (1999), Nutrition Secrets, Jaypee Brothers, New Delhi, P- 302-310.

- b) Diet in cancer

#### Reference

American cancer society – [www.cancer.org](http://www.cancer.org)

#### Module II

Diet in gastritis and peptic ulcer- Aetiology, symptoms, dietary management, chemically and thermally irritating foods.

## Reference

Patient care- [www.patientcareonline.com](http://www.patientcareonline.com)

## Module III

Diet in diseases of liver- Aetiology, symptoms, dietary treatment in jaundice, hepatitis, cirrhosis and hepatic coma- dietary treatment in cholecystitis and cholelithiasis

## Reference

Mahan L.K and Stump S.E, Krause , Food nutrition and diet therapy,

Pp: 740-748.

## Module IV

Diet in Diabetes Mellitus – Aetiology, symptoms, types, test for detection, dietary treatment and complications of diabetes.

## References

Raghuram ,T .C (2000), Diet and Diabetes Mellitus, National Institute of Nutrition , Hyderabad ,P : 95-103.

## Module V

Diet in renal disease- symptoms, dietary treatment of glomerulonephritis, nephrosis, renal failure and dialysis.

## Reference

Kumar .P. and Clark M (2005) , Clinical Medicine, 6<sup>th</sup> edition, Elsevier Saunders Publishing Co. Pp:605-687.

## **Module VI**

Diet in cardiovascular disease- Atherosclerosis, Hypertension- aetiology, symptoms , dietary management.

### **Reference**

Garrow ,J. S and James, W.P.T., Human Nutrition and Dietetics, P:619-637.

## **Module VII**

Diet in allergy and skin disturbances- Definition, classification, symptoms, tests and dietetic treatment.

### **Reference**

Srilakshmi, B. (2005). Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi.

## **Module VIII**

Diet and drug interaction

### **Reference**

Robinson. C.H, Lawler M.R (1986), Normal and Therapeutic Nutrition, Macmillan Publishing Co, New York. Pp; 403-409.

### **Suggested Reading**

- Gibney, M J., Elia.M, Ljungqvist. O (2005) ,Clinical Nutrition, Biackwell Science publishing Co.
- Guthrie, H.A & Picciano, M.F (1995), Mosby Publishing Co, New York,

- Etherton, P and Burus J.H.(1998), Cardiovascular nutrition, American Dietetic Association ,Chicago.
- Kumar .P., Clark M (2005) , Clinical Medicine, 6<sup>th</sup> edition, Elsevier Saunders Publishing Co.
- Nutrition and changing kidney function, National Kidney Foundation New York.
- Patient Education Handbook- Diabetic Education(2000), Good Shepherd Medical Centre, Texas.
- Swaminathan, M (1989), Hand Book of Food and Nutrition, Bangalore Printing & Publishing Co, Bangalore.
- [www.mediindia.net /patient/paediatrics](http://www.mediindia.net/patient/paediatrics).

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## **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER III

### CORE COURSE V111- FOOD MICROBIOLOGY

Total hours of instruction: 54

Credits: 3

Hours/ week: 4

#### Objectives

To enable the students to:

- to acquire an elementary knowledge about microorganisms
- to understand the role of microorganism in contamination and spoilage of different foods.

#### Module I

Introduction to Microbiology- Definitions of microbiology and microbes, Beneficial effects of microorganisms.

Microbial growth curve, effect of environmental factors on growth curve- PH, moisture, temperature, oxygen availability, nutrients and others.

#### Reference

Mani.A, Selvaraj.A.M , Narayanan.L.M , Arumugham.N.(1999),  
Microbiology- General and Applied, Saras publications , Nagargoil. Pp.1-9.

#### Module II

Microorganisms

General morphology, characteristics and economic importance of :

- A) Bacteria,
- B) Fungus
- C) Virus
- D) Algae
- E) Protozoa

## Reference

James.M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi Pp.17-19

Frazier.W.C &Westhoff.D.C(1997), Food Microbiology,Tata McGraw-Hill publishing company Ltd,New Delhi.Pp.17-58.

### **Module III-**

Food contamination and spoilage - Sources of contamination, types of spoilage of foods, classification of foods based on perishability, effect of microorganisms on food spoilage.

## Reference

Frazier.W.C &Westhoff.D.C(1997), Food Microbiology,Tata McGraw-Hill publishing company Ltd,New Delhi.Pp.59-79.

### **Module IV**

Cereals and cereal products - Contamination and spoilage of cereals and cereal products.

## Reference

Frazier.W.C &Westhoff.D.C(1997), Food Microbiology,Tata McGraw-Hill publishing company Ltd,New Delhi.Pp.174-186.

### **Module V**

Fats and Oils - Contamination and spoilage of fats and oils

## References

Frazier.W.C &Westhoff.D.C(1997), Food Microbiology,Tata McGraw-Hill publishing company Ltd, New Delhi.Pp.310-312.

### **Module VI**

Fruits and Vegetables - Contamination and spoilage of fruits and vegetables.

## References

James, M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi Pp.187-196.

## Module VII

Contamination and spoilage of Animal Products

- A) Milk and milk products
- B) Meat and poultry
- C) Fish and other sea foods
- D) Egg

## References

Powar.C.B and Dagainawala H.F. (1999) General Microbiology , Vol.II , Himalaya Publishing House, Pp.42-58

James, M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi Pp.200-227

## Module VIII

Canned Foods - Contamination and spoilage of canned foods

## References

James, M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi Pp.243-247

## Module IX

Sugar and Sugar Products - Contamination and spoilage of sugar and sugar products

## Reference

James.M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi P: 239.

## **Module X**

Control of Microbial Growth in Foods - Controlling Temperature, Removing Oxygen, Adding Chemical Preservatives, Reducing Moisture Content, Exposure to UV rays

### **Reference**

Roday, S. (1999) Food Hygiene And Sanitation, Tata Mc Graw-Hill Publishing Co. Ltd, New Delhi Pp:19-22

### **Suggested readings**

- Frazier. W.C & Westhoff. D.C (1997), Food Microbiology, Tata McGraw-Hill publishing company Ltd, New Delhi.
- James. M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi
- Mani. A, Selvaraj. A.M , Narayanan. L.M , Arumugham. N. (1999), Microbiology- General and Applied, Saras publications , Nagarcoil.
- Roday. S. (1999) Food Hygiene And Sanitation, Tata Mc Graw-Hill Publishing Co. Ltd, New Delhi.

## **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

### **Job training**

## SEMESTER III

### CORE COURSE IX –SANITATION AND HYGIENE

Total hours of instruction: 54

Credits: 3

Hours/ week: 4

Objectives

To enable the students to:

- Understand the role of microorganisms in food borne illness
- Know the need for implementing sanitary procedures and attitudes.

#### Module I

Introduction to Sanitation and Hygiene

Definitions of sanitation and hygiene, significance of sanitation in food industry.

Reference

Roday .S.(1999) Food Hygiene and Sanitation, Tata Mc Graw-Hill company Limited, New Delhi.

#### Module II

Food Borne Illness

Food borne illnesses caused by Bacteria, Virus and Parasites

Reference

James.M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi. Pp.611-636, 651-657

Adams.M.R and Moss.M.O (2000) Food Microbiology, new Age International Ltd. New delhi Pp. 136-219.

### **Module III**

Food Hazards

Natural toxicants in foods , Chemicals, antibiotics, Hormones and Metal contamination

#### **Reference**

Roday .S.(1999) Food Hygiene and Sanitation, Tata Mc Graw-Hill company Limited, New Delhi .

James.M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi. Pp 641-650

Adams.M.R and Moss.M.O (2000) Food Microbiology, New Age International Ltd. New Delhi Pp. 219-223.

### **Module IV**

Personal Hygiene of food handler

Importance of personal hygiene of food handler- habits, clothes, illness.

#### **Reference**

Roday .S.(1999) Food Hygiene and Sanitation, Tata Mc Graw-Hill company Limited, New Delhi.

### **Module V**

Hygienic Food Handling

Purchasing and receiving safe food—important points to be observed for various foods. Food storage- guidelines for storage, dry food storage, refrigerated storage, freezer storage. Storage of specific foods , storage of foods at high temperatures. Sanitary procedures while preparing, cooking and holding food. Safety of left over foods.

## Reference

Roday , S. (1999) Food Hygiene and Sanitation, Tata Mc Graw-Hill company Limited, New Delhi Pp 69-93.

## **Module VI**

### Cleaning Methods

Sterilization and Disinfection- products and methods, use of detergents, heat, chemicals, steps in cleaning utensils and equipments.

## Reference

Roday .S.(1999) Food Hygiene and Sanitation, Tata Mc Graw-Hill company Limited, New Delhi Pp 144-153

## **Module VII**

### Waste Product Handling

Planning for waste disposal-solid waste,liquid waste-sewage.

## Reference

Roday .S.(1999) Food Hygiene and Sanitation, Tata Mc Graw-Hill company Limited, New Delhi Pp .593-617.

## **Module VIII**

### Pest control.

Importance of pest control, classification of pests-houseflies, cockroach, rats.

## **Module IX**

Relevance of microbiological standards for food safety.

## Referance

James, M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi. Pp .413-448

### **Suggested readings**

- Adams, M.R and Moss.M.O (2000 Food Microbiology, New Age International Ltd. New Delhi.
- James, M.J (1996) Modern Food Microbiology 4<sup>th</sup> edition, CBS Publications and distributors, New Delhi.
- Roday .S.(1999) Food Hygiene and Sanitation, Tata Mc Graw-Hill company Limited, New Delhi.

### **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

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## **SEMESTER III**

### **CORE PRACTICAL X – ADVANCED DIETETICS I**

Total hours of instruction – 36

Hours / Week: 3

Credit – 2

Objectives:

- To enable student to prepare diets for various diseases within specified cost limits.

#### **Module I**

Standardization of common food preparation.

#### **Module II**

Planning full, normal, soft, high and low caloric diet with modified fat and carbohydrate levels.

#### **Module III**

Planning and preparation of diet with modified consistency, fibre and residue.

#### **Module IV**

Planning and preparation of diet for diarrhoea and constipation and peptic ulcer.

#### **Module V**

Planning and preparation of diet in fever – Typhoid and Tuberculosis.

#### **Module VI**

Planning and preparation of diet for NIDDM patient.

#### **Suggested Readings**

- Antia F.P., Clinical Dietetics and Nutrition, 2<sup>nd</sup> ed. Oxford University, Delhi.

- Bhala S.M.L, Bhatia N, and Gopinath(1983) Diet Manual for heart patient, CTC, AHMS, New Delhi.
  - Gibrey M.J, Elia. M, Gungquist. O, (2005), Clinical Nutrition, Blackwell Science Publishing Co.
  - Mahan L.K, Stump S.E, Krause's, Food Nutrition and Diet Therapy.
  - Patient care – [www. patientcareonline.com](http://www.patientcareonline.com)
  - Robinson C.H., and Winely E.S (1984) Basic Nutrition and Diet Therapy 5<sup>th</sup> ed., Macmillian Pub. Co. New York.
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### Semester IV

<b>Course Title</b>	<b>Hours/Week</b>	<b>Credit</b>	<b>Total Credit</b>
Core Course XI – Quantity Food Production & Service	4	4	20
Core Course XII – Food Commodities	4	3	
Core Course XIII – Community Nutrition	4	3	
Core Course XIV – Practical Advanced Dietetics – II	3	2	
I Complementary Paper	3	2	
I Complementary Practical	2	2	
II Complementary Paper	3	2	
II Complementary Practical	2	2	
Hospital Internship	-	-	

## SEMESTER- IV

### CORE COURSE: XI – QUANTITY FOOD PRODUCTION AND SERVICE

Total hours of instruction : 72

Hours / Week : 4

Credit : 4

Objectives:

- To understand the application of basic principles to bulk production of the food.
- To gain knowledge regarding selection and purchase of food.
- To develop skills in menu planning for quantity preparation.
- To understand the different styles of food service in volume feedings.

#### Module I

Introduction to different food service outlets: Definition of catering industry, functions, types of catering establishments, commercial catering (hotels and restaurants), welfare catering (hospital), industrial catering and transport catering.

Reference

Kinton, R. and Cesarani, V. (1999), The theory of catering, 8<sup>th</sup> edition, ELBS publishing, Pp: 14-25

#### Module II

Different food and beverage outlet.

Reference

Varghese, B. (1999), Professional Food and Beverage Service Management, Macmillan India Ltd., Pp: 15-22

#### Module III

Menu planning: Sequence of course – Indian, (North Indian, South Indian, West Indian and Gujarathies) Western and others, Technique of writing menus, Functions of menu.

## Reference

Varghese, B. (1999), Professional Food and Beverage Service Management, Macmillan India Ltd., Pp: 65-72

## Module IV

Types of meals and styles of service – Breakfast, lunch, dinner, afternoon tea, snacks, table d’hote and a’la carte menu.

## Reference

Colleer, M. and Sussams, C. (2000), Success in principles of catering, Richard Clay Ltd, Pp: 288-290

## Module V

Introduction to basic and special equipment for food production and service: Care and use of equipment.

## Reference

Andrews, S. (1997), Food and Beverage Service, Tata Mc-Graw Hill Publishing Company Ltd., Pp: 19-26

## Module VI

Types of services of food and beverage outlets. Staff organization of different outlets – manager, hostess, supervisor, steward, waiter.

## Reference

Varghese, B. (1999), Professional Food and Beverage Service Management, Macmillan India Ltd., Pp: 28-31, 47-49

## Module VII

Beverages: Classification – alcoholic and non-alcoholic, hot and cold beverages.

## Reference

Andrews, S. (1997), Food and Beverage Service, Tata Mc-Graw Hill Publishing Company Ltd., Pp: 87-123

## **Module VIII**

Uses of bills and checks on control system outlets.

### **Reference**

Andrews, S. (1997), Food and Beverage Service, Tata Mc-Graw Hill Publishing Company Ltd., Pp: 49-51

## **Module IX**

Equipments in food service: Classification of equipments, factors for selection of equipments.

### **Reference**

Sethi, M and Malhan, S (1991), Catering Management, Wiley Eastern Ltd, Pp:8-20

## **Module X**

Planning food service unit: Layout of food plants, plans of areas of food preparation, different work centres, lighting and ventilation.

### **Reference**

Roday, S (1999), Food hygiene and sanitation, Tata Mc Graw-Hill Publishing Ltd, New Delhi, Pp: 117-136.

## **Suggested Readings**

- Anderson, F. (1996), Home Appliance Servicing Taraporwals Sons. & Co.
- Arora, K., (2002), Theory of Cookery, Frank Bros. & Co., Ltd., New Delhi.
- Avery, A.A, Modern Guide to Food Service Equipment, C.B, Publishings.
- Berry, M., (1995), Complete Cook Book, Dorling Kindersley Ltd., London.
- Fuller, J. (1983), Modern Restaurant Service, Hutckinson.
- Hsiung, D.T., (1994), Chinese Cantonese Cooking, Parragon Book Service Ltd., England.
- Johnson, J.B, (1995), Equipment for Modern Living, Macmillan company Ltd
- Khan, M.A. (1987), Food Service Operations, Avi Publishing Company.

- King, C.A., (1988), Professional Dining Room Management, VNR, New York.
- Lillicrap, D.K., (1989), Food and Beverage Service, 2<sup>nd</sup> edition, BLBS.
- Shiring, S.B., Jardine, R.W. and Mills, R.J (2000), Introduction to Catering, Thomson Asia Ltd., Singapore.
- Tompkins, D., Table Layout and Decoration, Ward Lock and Co. Ltd.

## **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER- IV

### CORE COURSE XII: FOOD COMMODITIES

Total hours of instruction –54

Hours / Week: 4

Credit – 3

Objectives:

- To understand the basic commodities, both raw and processed used in catering and various aspects of their production and distribution.
- To discuss the qualities and standard of available commodities and their suitability for different purposes.

#### Module I

Cereals and Pulses:

Cereals : Structure, composition and nutritive value, specific cereals, processing and breakfast cereals.

Pulses: Nutritive value, processing and toxic constituents.

Reference

Potter N.N, Hotchkiss J.H (1997), Food Science, Fifth edition. S.K. Jain for CBS publishers and Distributors, Durga Ganj, New Delhi.

#### Module II

Fats and Oils: Nutritive value, sources of fats and oils, extraction of edible oils and storage.

Reference

Botton. E.R, (1999), Oils, fats and fatty foods, their practical application, Biotech Publishing Company, Pp: 141-160

#### Module III

Egg: Nutritional aspects, structure, composition, egg quality and selection.

## Reference

Sreelakshmi B (2005), Food Science, Third Edition, New Age International Publishing Ltd, Ansari Road, Dargagani, New Delhi.

## **Module IV**

Fish, Poultry and Meat: Composition, nutritive value, selection, and storage.

## Reference

Manay N.S, Shadakshara Swami M (2005), Foods – Facts and Principles. New Age International Publishers.

## **Module V**

Vegetables and Fruits – Composition and nutritive value, selection and storage.

## Reference

Khader. V (2003), Foods – Nutrition & Health, Fifth Edition, Xpress Graphi Delhi. Pp: 65-81

## **Module VI**

Sugar and Related products: Nutritive value, sugar related products and sugar cookery.

## Reference

Sreelakshmi B (2005), Food Science, 3<sup>rd</sup> Edition New Age International Publishing Ltd. Ansari Road, New Delhi. Pp: 212-220

## **Module VII**

Milk and Milk products: Composition, Nutritive value, processing, and milk products.

## Reference

Mc Williams. M (1997) Foods Experimental perspectives, 3<sup>rd</sup> edition, Mc Millian Publishing Company, New Jersey

[Wikipedia.org/wiki/Dairy-product](http://Wikipedia.org/wiki/Dairy-product)

[www.Indiadairy.com](http://www.Indiadairy.com)

[www.Indianmilkproducts.com](http://www.Indianmilkproducts.com)

## **Module VIII**

Miscellaneous Foods: Beverages (Tea, Coffee, and Chocolate), Spices and condiments, Raising Agents.

### **Suggested Readings**

- Clarke. D, Herbert. E (1992).). Botton. E.R, (1999), Oils, fats and fatty foods, their practical application, Biotech Publishing Company
- Eckles C.H, Combs. W.B, Macy. H (1998). Milk and Milk Products, MC Graw Hill Companies.
- Gopalan. C, Ramashathri V.V, Balasubramanyan S.C (1996), Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR.
- Manay N.S, Shadaksharaswamy. M (2005), ), Foods – Facts and Principles. New Age International Publishers.
- Matz. S.A (1996). The chemistry and technology of cereals and food of feed; Chapman & Hall, New York.
- Peckham C.G, Greaves H.T (1979). Foundation of food preparations, Mac Millan Publishing Co, New Delhi.

### **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER - IV

### CORE COURSE XIII – COMMUNITY NUTRITION

Total hours of instruction: 54

Hours / Week: 4

Credit: 3

Objectives:

- To understand the importance of nutrition in national progress and the significance of the assessment of nutritional status.
- To find solutions to overcome problems of malnutrition in the community.
- To study the role of national and international agencies in this area.

#### Module I

Introduction to nutrition and health in national development. Nutritional problems existing in our country. The causes of malnutrition in India.

Reference

Rao, K.S. (1997), Community Health Nursing, B.I. Publications Pvt. Ltd., Chennai, Pp: 82-85

#### Module II

Methods of assessment of nutritional status. Direct assessment and indirect assessment.

Reference

Gibney, M.J, Margetts, B.M, Kearney, J.M and Arab, L. (2005). Public Health Nutrition, Blackwell Publishing, USA, Pp: 66-81

#### Module III

Nutrition intervention schemes in the community – Lecture and method demonstrations, nutrition exhibitions and visual aids.

Reference

Ramachandran, L. and Dharmalingam, T. (2005), Health Education, Vikas Publishing House Pvt. Ltd., New Delhi, Pp: 224-233.

#### **Module IV**

National and International Agencies in Community Nutrition – ICDS, WHO, UNICEF, NIN, CFTRI.

#### **Reference**

Chalkley, A.M. (1990), A text book for the health worker, Vol. I, Wiley Eastern Limited, New Delhi, Pp: 130-133

#### **Module V**

Breast feeding and its implications. Hazards of bottle feeding.

#### **Reference**

Srilakshmi, B. (2004), Dietetics, New Age International Pvt. Ltd, New Delhi, Pp: 16-22.

#### **Module VI**

Weaning Foods – Planning, formulating and preparing, Importance of correct and timely weaning.

#### **Reference**

Chalkley, A.M. (1990), A text book for the health worker, Vol. I, Wiley Eastern Limited, New Delhi, Pp: 267-269

#### **Module VII**

Nutrition and infection – relationship, Immunization and its importance.

#### **Reference**

Lalitha. M, (1997), Major Issues in Food and Nutrition Science, Kanishka Publishers, New Delhi, Pp: 69-81

Rao, K.S. (1997), Community Health Nursing, B-I Publications Pvt. Ltd., New Delhi, Pp: 209-212.

## **Module VIII**

Recent advances in community nutrition research – fortification, enrichment of foods.

### **Reference**

Bamji, M.S, Rao, N.P and Reddy, V. (2003), Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, Pp: 470-479

### **Suggested Reading**

- Dandiya, P.C, Zafer, Z.Y.K and Zafer, A. (2003), Health education and community pharmacy, Vallabh Prakashan Printers, New Delhi.
- Khader, V. (2003), Foods – Nutrition and Health, Kalyani Publishers, New Delhi.
- Park. K, (2005), Park's Textbook of Preventive and Social Medicine, 18<sup>th</sup> edition, Banarsidas Bhanot Publishers, Jabalpur.
- Reddy, R.S. (1998), Nutrition Education, Commonwealth Publishers, New Delhi.
- Sreedevi, V. (1997), Nutrition Education, Discovery Publishing House, New Delhi.
- Swaminathan, M. (2004), Food and Nutrition, Vol. II, 2<sup>nd</sup> edition, BAPPCO Publishers, Bangalore.

## **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

**SEMESTER - IV**  
**CORE PRACTICAL XIV – ADVANCED DIETETICS II**

Total hours of instruction : 36

Hours per week : 3

Credit : 2

**Objectives**

- To emphasis skill development in the formulation and use of diet prescriptions.
- To provide greater exposure to dietetic practices followed in Indian hospital.

**Module I**

Planning and preparation of diet for hypertensive patient.

**Module II**

Planning and preparation of diet in glomerulonephritis, nephrosis and renal failure.

**Module III**

Planning and preparation of diet in cancer.

**Module IV**

Planning and preparation of diet in obesity.

**Module V**

Planning and preparation of diet in atherosclerosis.

**Module V**

Planning and preparation of diet in surgery.

### **Suggested Readings**

- Bhala S.M.L, Bhatia N, Gopinath. Diet Manual for heart patient, CTC, AHMS, New Delhi (1983)
- Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Backwell Science Publishing Co.
- Robinson C.H and Winely E.S, Basic Nutrition and Diet Therapy 5<sup>th</sup> ed, Macmillian Pub. Co. New York (1984)
- Swaminathan M (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing Company to Ltd.

### **INTERNAL EVALUATION**

#### **Job training**

### Semester V

<b>Course Title</b>	<b>Hours/Week</b>	<b>Credit</b>	<b>Total Credit</b>
Core Course XV – Fundamentals of Biochemistry	5	4	20
Core Course XVI – Personnel Management	4	4	
Core Course XVII- Family Meal Management	4	4	
Core Practical XVIII – Family Meal Management	4	2	
Core Practical XIX – Human Physiology	4	2	
Open Course – Food Preservation	4	4	

## SEMESTER - V

### CORE COURSE XV- FUNDAMENTALS OF BIOCHEMISTRY

Total hours of instruction: 72

Credit: 4

Hours per week: 5

#### Objectives

- To understand knowledge about biomolecules which are the basis of life.
- To study about energy currency of the cell and chemical messengers.

#### Module I

Molecular Aspect of transport - Passive diffusion, Facilitated diffusion, Active transport, Sodium-Potassium pump. transport of macromolecules : Endocytosis, exocytosis.

#### Reference

Satyanarayana U (2005) Biochemistry, Uppala Author Publisher Interlinks, Vijayawada. Pp: 565-569.

#### Module II

Biological Oxidation

High energy compounds, mechanism of electron transport chain, oxidative phosphorylation.

#### Reference

Deb A.C (2002), Fundamentals of Biochemistry, 8<sup>th</sup> edition, New Central Book Agency, Kolkata, Pp: 141-162

Satyanarayana U (2005), Biochemistry, Uppala. Author – Publisher Interlinks, Vijayawada. Pp: 228-240

#### Module III

Genetic Control of Metabolism.

Nucleic acids: DNA – Structure, function, replication RNA: Types structure and functions. DNA repair mechanisms, genetic code and protein biosynthesis.

Recombinant DNA Technology: Applications, Restriction endonucleases, vectors, gel electrophoresis, blotting techniques, hybridoma technology, PCR, DNA finger printing.

#### Reference

Murray K.R, Granner D.K (2003), Harper's Illustrated Biochemistry, 26<sup>th</sup> edition, Lange Medical Publications, London, Pp: 378-432.

Satyanarayan U (2005), Biochemistry, Uppala Author Publisher Interlinks, Vijayawada, Pp: 577-586

#### Module IV

Hormones: Pituitary, Adrenal, Thyroid and Reproductive hormones, Prostaglandins.

#### Reference

Talwar G.P, Srivastava L.M (2003), Textbook of Biochemistry and Human Biology, 3<sup>rd</sup> edn, Prentice – Hall of India Private Ltd, Pp: 771-781

Deb A.C (2002), Fundamentals of Biochemistry, 8<sup>th</sup> edition, New Central Book Agency, Kolkata, Pp: 462-485

#### Module V

Enzymes: Definition, classification, mechanism of action, coenzyme.

#### Reference

Satyanarayana U (2005), Biochemistry, Uppala Author – Publisher Interlinks, Vijayawada, Pp: 577-586.

### **Suggested Readings**

- Devlin T.M (2002), Text book of Biochemistry with Clinical Correlations, A John Wiley and Sons Publications.
- Fatima D. et al, (1999) Biochemistry, Saras Publication, Nagarcoil, Tamil Nadu.
- Leninger A.L (1987), Principles of Biochemistry, CBS Publishers and Distributors.
- Pattabhiraman T.N (1993), Principles of Biochemistry, Prithvi Book Agency.
- Rao K.R (1986), Text book of Biochemistry III Edition, Prentia Hall of India Ltd, New Delhi.

### **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER - V

### CORE COURSE XVI – PERSONNEL MANAGEMENT

Total hours of instruction: 72

Credit: 4

Hours / Week: 4

#### Objectives

To enable the students to

- Understand the management of human and material resources in food service establishment.

#### Module I

Organisation and management – Definition and types of organization, definition, functions and tools of management, technique of effective management, energy and time management and its application to food preparation and science.

#### References

Chunawalla, S.A (2000), Essentials of Management, Himalaya Publishing House, Mumbai, Pp: 114-139

Mamoria, C.B (2000), Personnel Management, Himalaya Publishing House, Mumbai, Pp: 117-139.

Rao, P.S (2000), Personnel and Human Resource Management, Himalaya Publishing House, Mumbai. Pp: 28-40

Sethi, M. and Malhan, S. (2008), Catering Management, New Age International Publishers, New Delhi, Pp: 1-40

#### Module II

Food Material Management – Meaning, definition, importance, food selection, purchasing, receiving and store-room management.

#### References

Jitendra, M.D (1999), Catering Management, Dominant Publishers and Distributors, Delhi, Pp: 192-226, 111-176

Sethi, M. and Malhan, S. (2008), Catering Management, New Age International Publishers, New Delhi, Pp: 1-40

### **Module III**

Personnel Management – Recruitment, selection and training of personnel, work standards, productivity, supervision, performance appraisal, motivations, incentives for effective performance.

#### **References**

Chunawalla, S.A (2000), Essentials of Management, Himalaya Publishing House, Mumbai.Pp: 156-169

Mamoria, C.B (2000), Personnel Management, Himalaya Publishing House, Mumbai. Pp: 403-446, 203-233

Rao, P.S (2000), Personnel and Human Resource Management, Himalaya Publishing House, Mumbai. Pp: 53-85

Sethi, M. and Malhan, S. (2008), Catering Management, New Age International Publishers, New Delhi, Pp: 331-343, 350-358

### **Module IV**

Laws affecting food service operations, union and contract negotiations. Visits to different types of food service institutions to study the following.

(eg: Hospitals, flight kitchen, hotel, restaurant, canteen (industrial))

- a) Organization
- b) physical plan and layout
- c) Food Service Equipment
- d) Sanitation and hygiene

#### **References**

Pylee, M.V and George, A.S (2007), Industrial Relations & Personnel Management, 2<sup>nd</sup> ed. Vikas Publishing House, New Delhi, Pp: 172-189

Sethi, M. and Malhan, S. (2008), Catering Management, New Age International Publishers, New Delhi, Pp: 387-399.

### **Suggested Readings**

- Chunawalla, S.A (2000), Essentials of Management, Himalaya Publishing House, Mumbai.
- Jitendra, M.D (1999), Catering Management, Dominant Publishers and Distributors, Delhi.
- Mamoria, C.B (2000), Personnel Management, Himalaya Publishing House, Mumbai.
- Pylee, M.V and George, A.S (2007), Industrial Relations & Personnel Management, 2<sup>nd</sup> edition, Vikas Publishing House, New Delhi.
- Rao, P.S (2000), Personnel and Human Resource Management, Himalaya Publishing House, Mumbai.
- Sethi, M. and Malhan, S. (2008), Catering Management, New Age International Publishers, New Delhi.

### **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER V

### CORE COURSE XVII- FAMILY MEAL MANAGEMENT

Total hours of instruction – 72

Credit – 4

Hours / Week: 4

#### Objectives:

To enable the students to:

- Acquire knowledge of the principles of planning diets for various stages of life.
- Develop ability to plan balanced diet for various activity groups and for various socio-economic levels.

#### Module I

Introduction to meal management: Balanced diet.

Meal planning: Principles and steps in meal planning.

#### References

Bamji, M.S, Reddy V (1998), Text Book of Human Nutrition, Oxford & IBH Publishing Co, New Delhi, Pp: 186-192

Srilakshmi, B. (2005). Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi. Pp: 1-19

Swaminathan, M (1989), Hand Book of Food and Nutrition, Bangalore Printing & Publishing Co, Bangalore. Pp: 162-169

#### Module II

Nutritional and Food Requirements for Adults: Nutrients requirements.

#### Reference

Srilakshmi, B. (2005). Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi. Pp: 15-17

Wardlaw. G, M and Insel, P.M (1993). Perspectives in Nutrition 2<sup>nd</sup> edition, Mosby Publishing Co, London. Pp: 555-562

### **Module III**

Nutrition in Pregnancy: Physiologic changes during pregnancy, Nutritional requirements, General dietary problems, complication of pregnancy.

#### **Reference**

Robinson. C.H, Lawler M.R (1986), Normal and Therapeutic Nutrition, Macmillan Publishing Co, New York. Pp: 265-276

Srilakshmi, B. (2005). Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi. Pp: 88-102

### **Module IV**

Nutrition during Lactation: Physiology of lactation, nutritional requirements, dietary guidelines during lactation.

#### **Reference**

Wardlaw. G, M and Insel, P.M (1993). Perspectives in Nutrition 2<sup>nd</sup> edition, Mosby Publishing Co, London.Pp: 509-515

Srilakshmi, B. (2005), Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi. Pp: 103-109

### **Module V**

Nutrition during infancy: Growth and development, nutritional requirements, Breast feeding, Artificial feeding.

#### **Reference**

Guthrie, H.A & Picciano, M.F (1995), Mosby Publishing Co, New York, Pp: 544-560

Srilakshmi, B. (2005). Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi. Pp: 21-34.

## **Module VI**

Nutritional requirements for Pre-school children: Nutritional and Food requirements, Nutrition related problems of preschoolers – PEM and Vitamin A deficiency.

### **Reference**

Robinson. C.H, Lawler M.R (1986), Normal and Therapeutic Nutrition, Macmillan Publishing Co, New York. Pp: 306-308

Srilakshmi, B. (2005), Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi. Pp: 45-64.

## **Module VII**

Nutrition of School Children : Nutritional requirement, Feeding problems, Packed lunches.

### **Reference**

Guthrie, H.A & Picciano, M.F (1995), Mosby Publishing Co, New York.Pp: 375-378

Srilakshmi, B. (2005), Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi. Pp: 65-69

## **Module VIII**

Nutrition during Adolescence: Nutritional requirements, Food habits, Nutritional Problems.

### **Reference**

Guthrie, H.A & Picciano, M.F (1995), Morby Publishing Co, New York Pp: 585-593

Srilakshmi, B. (2005). Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi. Pp: 80-86.

## **Module IX**

Nutrition during old age: Factors affecting nutrition of elderly persons, nutritional requirements, nutrition related problems of old age.

### **Reference**

Guthrie, H.A & Picciano, M.F (1995), Morby Publishing Co, New York, Pp: 603-615

Srilakshmi, B. (2005). Dietetics, 5<sup>th</sup> edition, New Age International Publishers, New Delhi. Pp: 111-122.

### **Suggested Readings**

- Bamji, M.S, Reddy V (1998), Text Book of Human Nutrition, Oxford & IBH Publishing Co, New Delhi.
- Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Backwell Science Publishing Co.
- Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy 5<sup>th</sup> ed, Macmillian Pub. Co. New York .
- Swaminathan M (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing Company to Ltd.

## **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## **SEMESTER V**

### **CORE PRACTICAL XVIII – FAMILY MEAL MANAGEMENT**

Total hours of instruction: 36

Credit: 2

Hours / Week: 4

Objectives:

To enable the students to

- Learn the principles of meal planning
- Plan and prepare meals for the family members at different income levels and different physiological status

#### **Module I**

Basic principles of meal and menu planning.

#### **Module II**

Daily food guide – Basic five food groups, use of food groups, food costing.

#### **Module III**

Planning for adult man and woman during different physical activities – sedentary, moderate and heavy workers, preparation of above diets.

#### **Module IV**

Planning and preparation of a balanced diet for a pregnant woman, nutritional requirements, modification of dietary pattern, complications during various stages of pregnancy.

#### **Module V**

Planning and preparation of a balanced diet for a nursing mother, modification of normal meal pattern, special foods given during lactation, nutritional requirements.

## **Module VI**

Nutrition during infancy – nutritional requirements during infancy, advantages of breast feeding, disadvantages of bottle feeding.

## **Module VII**

Supplementary feeding – preparation of weaning foods.

## **Module VIII**

Planning and preparation of diet for a toddler, pre-school child – nutritional requirements, food pattern acceptance.

## **Module IX**

Nutrition during school age – nutritional considerations, planning and preparation of meals/packed lunch.

## **Module X**

Nutrition during adolescence – growth and development, nutritional requirements, factors influencing food habits, preparation of meals.

## **Module XI**

Planning a diet for a senior citizen, factors affecting food intake and nutrient use, special needs, nutritional requirements, preparation of meals.

## **Module XII**

Planning of meals for a middle income family, important considerations in planning meals.

## **Suggested Readings**

- Guthrie, H.A. (1985), Introductory Nutrition, 6<sup>th</sup> edition, Times Mirror/Mosby College Publication, St. Louis.
- Mudambi, S.R and Rajagopal M.V, Fundamentals of food and nutrition, 34<sup>d</sup> ed, Wiley Eastern Ltd., New Delhi – 19.
- Recommended Dietary Intake for Indians, ICMR (2002)

## SEMESTER V

### CORE PRACTICAL XIX - HUMAN PHYSIOLOGY

Total hours of instruction: 36

Credit:2

Hours/ week: 4

Objectives:

- To enable the students to identify and analyses body cells and fluids.
- To gain technical skill in physical examination of body.

#### Module I

Microscopic examination of prepared slides- examine and .draw the following tissues

- a) Squamous, ciliated and columnar epithelia.
- b) Bone and cartilage
- c) Smooth, cardiac and striated muscle
- d) Nerve cell

#### Module II

Physical examination of body

- a) Pulse rate at rest and after exercise
- b) Determination of arterial blood pressure
- c) Measurement of body temperature: mouth, armpit, diurnal rhythm.

#### Module III

Examine the model: identify and draw

- a) Section of human heart
- b) Section of human kidney

## **Module IV**

### Examination of blood

- a) Smear preparation of human blood for RBC and WBC types
- b) Haematocrit of man
- c) Estimation of haemoglobin of man
- d) Testing of blood groups
- e) Enumeration of RBC of human blood
- f) Enumeration of WBC of human blood

## **Module V**

### Biochemical detection of abnormal constituents of urine

- a) Sugar
- b) Blood
- c) Albumin

## **Module VI**

### Quantitative analysis of Sugars

- a) Glucose
- b) Fructose
- c) Maltose

## **Suggested Readings**

- Chatterjee C.C (2003), Human Physiology, Kalyani Mukherjee Publishers, Kolkata.
- Wilson K J and Waugh A, (1999), Anatomy and Physiology in Health and Disease, British library of cataloguing in publishing data, London.

## SEMESTER V

### OPEN COURSE – FOOD PRESERVATION

Total hours of instruction: 72

Credit: 4

Hours/ week: 4

#### **Objectives:**

To enable students to

- To gain knowledge on spoilage.
- To understand different methods of preservation.

#### **Module I**

Principles of Food Preservation – Food spoilage, principles and importance of food preservation.

#### Reference

Manay N.S, Shadaksharaswami M (1998), Foods Facts and Principles, New Age International Pvt. Ltd., New Delhi. Pp: 469-474.

Frazier. W.C & Westhoff. D.C (1997), Food Microbiology, Tata Mc Graw-Hill Publishing Company Ltd., New Delhi. Pp: 83-90.

#### **Module II**

Methods of Preservation: Temperature, Preservatives Concentration, Fermentation and drying.

#### Reference

Sreelakshmi B (2005), Food Science, 3<sup>rd</sup> Edition, New Age International Publishing Ltd., Ansari Road, New Delhi. Pp: 334-345.

#### **Module III**

Preservation of fruits and vegetables: Use of heat, low temperature, drying and preservatives.

#### **Module IV**

Preservation of milk and milk products: Use of heat, drying, low temperature, preservatives and other methods.

#### **Module V**

Preservation of Meat, Fish, Poultry and Egg: Use of heat, low temperature, drying and preservatives.

#### **Suggested Readings**

- Kalia M, Sood. S (2000), Food Preservation and Processing, Kalyani Publishing, New Delhi.
- Potter N.N, Hotchkiss J.H (1996), Food Science C.B.S. Publication, New Delhi.
- Vangarde S.J, Wood Burn M (1999), Food Preservation and Safely, Surabhi Publications, Jaipur.

#### **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

### Semester VI

<b>Course Title</b>	<b>Hours/Week</b>	<b>Credit</b>	<b>Total Credit</b>
Core Course XX – Nutritional Biochemistry	5	4	20
Core Course XXI – Clinical Nutrition	5	4	
Core Course XXII – Research Methodology and Statistics	5	4	
Core Practical XXIII –Quantity Food Production	4	3	
Core Practical XXIV –Food Science	4	3	
Core Practical XXV –Community Nutrition	4	1	
Project	1	1	

## SEMESTER VI

### CORE COURSE XX -NUTRITIONAL BIOCHEMISTRY

Total hours of instruction: 72

Credit: 4

Hours/ week: 4

#### Objectives

To enable the students to-

- Gain an understanding of the application of biochemistry in foods, nutrition and diet therapy.
- Know the different metabolic pathways of macronutrients in human body.

#### Module I

##### Carbohydrate Metabolism

Function. Classifications and structure; Digestion, absorption and transport of carbohydrate; Metabolism of glucose (glycolysis), fructose and galactose; Metabolism of pyruvate and lactate; Metabolism of acetyl Co A (TCA cycle); Synthesis of ribose(HMP Shunt); Synthesis of glucose from noncarbohydrates (gluconeogenesis); Metabolism of Glycogen- Glycogenesis and Glycogenolysis.

#### References

Satyanarayana.U(2005), Biochemistry, Uppala Author-Publisher Interlinks,Vijayavada,A.P. Pp.251-290.

Hames B.D and Hooper N.M (2001) Instant notes on Biochemistry, Viva books private limited, New Delhi, Pp: 267-309.

#### Module II

##### Lipid metabolism

Function, classifications and structure ;Digestion, absorption and transport of lipids; Metabolism of Triacylglycerol,synthesis of fattyacid-saturated and unsaturated; Beta-oxidation of fattyacid- saturated and unsaturated;

Metabolism of Cholesterol; Metabolism of Ketonebodies, Glycolipids and Phospholipids.

#### References

Satyanarayana.U (2005), Biochemistry Uppala Author-Publisher Interlinks,Vijayavada,A.P. Pp.293-341.

Hames B.D and Hooper N.M (2001) Instant notes on Biochemistry, Viva books private limited, New delhi.Pp.311-342.

Jain J.L , Jain S , Jain N.(2005),Fundamentals of Biochemistry, S.Chand & Company LTD , New Delhi. Pp: 594-640.

#### **Module III**

Protein metabolism

Function, classifications and structure; Digestion, absorption and transport of proteins; Protein biosynthesis, General pathways of aminoacid Metabolism -Deamination,transamination,decarboxylation,decarboxylation and demethylation; urea cycle and fate of ammonia.

#### References

Satyanarayana.U(2005), Biochemistry,Uppala Author-Publisher Interlinks,Vijayavada,A.P. Pp.45-71,343-395.

Jain J.L , Jain S , Jain N.(2005),Fundamentals of Biochemistry, S.Chand & Company LTD , New Delhi. Pp: 641-674.

#### **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

**SEMESTER VI**  
**CORE COURSE XXI – CLINICAL NUTRITION**

Total Hours of Instruction: 72

Credits – 4

Hours/Week: 5

**Objectives**

- To be familiar with the dietary/behavior modifications based on physiological changes occurring in disease condition.
- To obtain knowledge regarding metabolic process of normal and diseased organs and tissues.
- To acquire knowledge regarding effect of various diseases on nutritional status and nutrient requirements.

**Module I**

Disorders of metabolism – Inborn errors of metabolism (very brief), govt.

**Reference**

Deb. A.C, Fundamentals of biochemistry, Eighth edition (2004), Pp: 537-538, 264-266, 449-454.

**Module II**

Disease of gastrointestinal track – Aetiology symptoms, dietary modifications of ulcerative colitis, malabsorption syndromes, flatulence.

**Reference**

Antia F.P and Abraham P (1997), 4<sup>th</sup> Edition – Clinical dietetics and nutrition, Oxford University Press, New York, Pp:257-293.

### **Module III**

AIDS – Causes, symptoms and dietary management.

#### **Reference**

Mahan L.K, Stump S.E, Krause's Food Nutrition and Diet Therapy, 11<sup>th</sup> edition, 2000, Pp – 1032-1051.

### **Module IV**

Carbohydrates: Functions, Digestion, absorption. Dietary fibre and nutritional importance.

#### **Reference**

Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy 5<sup>th</sup> ed, Macmillian Pub. Co. New York Pp; 67-77.

### **Module V**

Lipids: Digestion, absorption, storage, production of ketone bodies, ketosis and ketogenic diet.

#### **Reference**

Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy 5<sup>th</sup> ed, Macmillian Pub. Co. New York ,Pp – 88-90, 606.

### **Module VI**

Protein: Digestion, absorption, utilization of dietary protein and amino acid in the body, measurement of protein quality. Improving protein quality of foods.

#### **Reference**

Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy 5<sup>th</sup> edition, Macmillian Pub. Co. New York Pp:48-58.

### **Suggested Readings**

- Mahan L.K, Stump S.E, Krause's Food Nutrition and Diet Therapy, 11<sup>th</sup> edition.
- Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy 5<sup>th</sup> ed, Macmillian Pub. Co. New York.
- Antia F.P and Abraham P (1997), 4<sup>th</sup> Edition – Clinical dietetics and nutrition, Oxford University Press, New York.

### **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER VI

### CORE COURSE XXII – RESEARCH METHODOLOGY AND STATISTICS

#### Objectives:

To enable the students to learn

1. The fundamentals of statistics
2. Practical application of statistics in research

#### Module I

An introduction to research methodology, meaning, objectives, characteristics of research, types of research, criteria of good research.

#### Reference

Kothari, C.R (2004), Research Methodology, 2<sup>nd</sup> edition, New Age International Pvt. Ltd., New Delhi. P: 1-21

#### Module II

Methods and tools of data collection. Methods: Survey, observation, interview, case study. Tools : Questionnaire

Collection of secondary data.

#### Reference

Kothari, C.R (2004), Research Methodology, 2<sup>nd</sup> edition, New Age International Pvt. Ltd., New Delhi. P: 95-12.

#### Module III

Collection, Sampling and tabulation of data, diagrammatic representation of data line and bar diagram, frequency polygon and pie diagram.

#### Reference

Gupta S.C (2000), Fundamentals of statistics, Himalaya Publishing House, Mumbai. P: 27-225.

## **Module IV**

Statistical Methods and Analysis – Mean, Median, Mode, Standard deviation and variance.

### **Reference**

Pillai R.S, Bagavathi. V, (2002), Statistics, S. Chand and Company Ltd, Chennai. P: 121-305

### **Suggested Readings**

- Ahnad Q.S, Ismail M.V, Khan S.A (2008), Biostatistics, University Science Press, New Delhi.
- Best J.W., Khan J.V (2003), Research in education, 9<sup>th</sup> edition, Prentice Hall of India Althoel S.C., (2002), Statistics, Cambridge University Press, UK.
- Sharma K.R (2002). Research Methodology, National Publishing House, New Delhi.
- Sophian C (1995), Representation and reasoning in early numerical development, counting, conservation, and comparison between sets. P: 559-577

## **INTERNAL EVALUATION**

**Assignments** - Best two assignments are considered per course.

**Seminar/ Viva** - The students has to take a minimum of one seminar per course.

**Class test** - A minimum of two class tests are to be attended. The grades of best two tests are to be taken.

## SEMESTER VI

### CORE PRACTICAL XXIII –QUANTITY FOOD PRODUCTION

Total hours of instruction: 54

Credit: 3

Hours/ week: 4

Objectives

- To enable students to organize, prepare and serve food for three different meals.

#### Module I

Rice and wheat preparations: Rice preparations -Chicken biriyani, Vegetable pulao, Tomato Rice, French Fried Rice, Coconut Rice (any three)

Wheat Preparations – stuffed paratha, spicy potato puri, hopper, crumb chops, spring roll (any three)

#### Module II

Pulse preparations – Channa chole, Dhal cutlet, Dhal kofta curry, Dhal Makhani (any three)

#### Module III

Vegetable preparations: Gobi Manjuriam, Vegetable Khorma, Shahi Mattar, Stuffed potatoes (any three)

#### Module IV

Meat and Fish preparations: Meat preparations: Butter chicken, chicken curry, masala, steaks beef roast with tomato gravy (any three)

Fish preparations: Tomato fish, chilly fish, fish molee, fish foogath (any three)

#### Module V

Snacks: Finger fish, Rainbow sandwich, Onion Pakoda, Vegetable burger (any three)

## **Module VI**

Sweets: Carrot burfi, bread gulab jamun, banana balls, coconut sweet (any three)

## **Module VII**

Puddings & Desserts: Pineapple and tender coconut pudding, chocolate pudding, bread pudding, fruit trifle (any three)

### **Suggested Readings**

- Khandwala V. (1987), Relish Food the Vegetarian Way, Vakils, Feffer and Simons Ltd., Bombay.
- Mathew K.M (2000), Modern Kerala Dishes.
- Ravindran B. (1990), My Favourite Recipes – Puddings and Desserts, Bhavi Publishing, Cochin.

**SEMESTER VI**  
**CORE PRACTICAL XXIV –FOOD SCIENCE**

(Internal evaluation only)

Total hours of instruction: 54

Credit: 3

Hours/ week: 4

Sugar Cookery

Starch Cookery

Meat, fish and poultry – changes during cooking.

Egg cookery

Milk cookery

Fruits and vegetables

1. Darkening of fruits
2. Effect of acid and alkali on pigments
3. Sensory evaluation

## SEMESTER VI

### CORE PRACTICAL XXV - COMMUNITY NUTRITION

Total Hours of Instruction: 18

Hours/Week – 4

Credit - 1

#### Objectives

To enable the students to

- Develop skills in field level application of the techniques of assessing nutritional status.
- Acquire skills in organizing and implementing community nutrition projects.

#### Module I

Techniques of nutritional assessment

- a) Anthropometry – Height, Weight, MUAC, BMI, WHR and growth monitoring.
- b) Diet survey – 24 Hrs dietary recall.
- c) Clinical Examination – Eyes, hair, nails, skin, lips, tongue, gums, teeth.
- d) Biochemical methods – Haemoglobin, blood and urine glucose.

#### Module II

Nutrition Education –

Conduct Nutrition education programme to various groups using visual aids.

#### Module III

Observation

- a) Noon meal programme
- b) Functioning of an anganwadi.

Project