BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI - 620024

B.SC. NUTRITION AND DIETETICS

CHOICE BASED CREDIT SYSTEM–LEARNING OUTCOMES BASED CURRICULUM FRAME WORK (CBCS - LOCF)

(Applicable to the candidates admitted from the academic year 2026-2027 onwards)

Sem	Part	Courses	Title	Ins. Hrs.	Credits	Exam. Hours	Maximum Marks		
							Int.	Ext.	Total
I	I	Ability Enhancement Course – I (AEC - I)	(Tamil$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –II (AEC - II)	English Course - I	6	3	3	30	70	100
	III	Core Course -1 (CC - 1)	Food Science	4	4	3	30	70	100
		Core Practical - 1 (CP - 1)	Food Science (P)	4	4	3	40	60	100
		Allied Course – 1 (AC - 1)	Human Physiology	4	4	3	30	70	100
		Allied Course Practical - 1 (AP-1)	Human Physiology and Food Chemistry	2	**	**	**	**	**
	IV	Value Education		2	2	3	30	70	100
		Interdisciplinary Course – 1 (IDC - 1) #	One Course from Outside Department	2	2	3	30	70	100
	Total			**30**	**22**	--	--	--	**700**
II	I	Ability Enhancement Course –III (AEC - III)	(Tamil$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –IV (AEC - IV)	English Course - II	6	3	3	30	70	100
	III	Core Course- 2(CC - 2)	Principles of Nutrition	4	4	3	30	70	100
		Core Practical - 2(CP - 2)	Principles of Nutrition (P)	4	4	3	40	60	100
		Allied Course – 2 (AC - 2)	Food Chemistry	4	4	3	30	70	100
		Allied Course Practical - 1 (AP-1)	Human Physiology and Food Chemistry	2	4	3	40	60	100
	IV	Skill Enhancement Course - 1(SEC - 1) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Interdisciplinary Course – 2 (IDC - 2) #	One Course from Outside Department	2	2	3	30	70	100
	Total			**30**	**26**	--	--	--	**800**

III	I	Ability Enhancement Course –V(AEC - V)	(Tamil$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –VI (AEC - VI)	English Course - III	6	3	3	30	70	100
	III	Core Course- 3(CC - 3)	Nutrition Through Life Cycle	4	4	3	30	70	100
		Core Practical - 3 (CP - 3)	Nutrition Through Life Cycle (P)	4	4	3	40	60	100
		Allied Course – 3 (AC - 3)	Fundamentals of Biochemistry	4	4	3	30	70	100
		Allied Course Practical - 2 (AP-2)	Fundamentals of Biochemistry and Food Processing and Preservation	2	**	**	**	**	**
	IV	Skill Enhancement Course - 2 (SEC - 2) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Interdisciplinary Course – 3 (IDC - 3) $$	One Course from Outside Department	2	2	3	30	70	100
		Health & Wellness @		--	1	--			100
	Total			**30**	**23**	--	--	--	**800**
	I	Ability Enhancement Course –VII (AEC - VII)	(Tamil$ / Other Languages+, #)	6	3	3	30	70	100
IV	II	Ability Enhancement Course –VIII (AEC - VIII)	English Course - IV	6	3	3	30	70	100
	III	Core Course- 4(CC - 4)	Dietetics	4	4	3	30	70	100
		Core Practical - 4(CP - 4)	Dietetics (P)	4	4	3	40	60	100
		Allied Course – 4 (AC - 4)	Food Processing and Preservation	4	4	3	30	70	100
		Allied Course Practical - II (AP-II)	Fundamentals of Biochemistry and Food Processing and Preservation	2	4	3	40	60	100
	IV	Skill Enhancement Course - 3 (SEC - 3) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Interdisciplinary Course – 4 (IDC - 4) $$	One Course from Outside Department	2	2	3	30	70	100
	Total			**30**	**26**	--	--	--	**800**
	Summer Internship / Industrial Activity during the Summer Vacation after II Year								

V	III	Core Course - 5 (CC - 5)	Bakery and Confectionary	4	4	3	30	70	100
		Core Course - 6 (CC - 6)	Food Service Management	5	4	3	30	70	100
		Core Course - 7 (CC - 7)	Fundamentals of Research Methodology and Statistics	5	4	3	30	70	100
		Core Course - 8 (CC - 8)	Community Nutrition	5	4	3	30	70	100
		Core Practical - 5(CP - 5)	Food Service Management (P)	5	4	3	40	60	100
	IV	Skill Enhancement Course - 4 (SEC - 4)		2	2	3	30	70	100
		Skill Enhancement Course - 5 (SEC - 5) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Introduction to Disaster Management		2	2	3	30	70	100
		Summer Internship / Industrial Activity @@	(with Viva-Voce)	--	2	--	20	80	100
	Total			**30**	**28**	--	--	--	**900**
VI	III	Core Course - 9(CC - 9)	Perspectives in Home Science	4	4	3	30	70	100
		Core Course- 10(CC - 10)	Food Standards and Quality Control	5	4	3	30	70	100
		Core Course- 11(CC - 11)	Functional Foods and Nutraceuticals	5	4	3	30	70	100
		Core Project Work(CPW) @@	Project Work (with Viva-Voce)	6	4	3	20	80	100
	IV	Value Added Course	General Studies for Competitive Examinations	2	1	--	30	70	100
		Skill Enhancement Course - 6 (SEC - 6)	Any one from the list	2	2	3	30	70	100
		Skill Enhancement Course - 7 (SEC - 7) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Environmental Studies		2	2	3	30	70	100
		Gender Studies		2	1	3	30	70	100
		Extension Activities *		--	1	--	--	--	--
	Total			**30**	**25**	--	--	--	**900**
	Grand Total			**180**	**150**	--	--	--	**4900**

ALLIED COURSE

First Year	Second Year
1. Human Physiology 2. Human Physiology and Food Chemistry 3. Food Chemistry 4. . Human Physiology and Food Chemistry	1. Fundamentals of Biochemistry 2. Fundamentals of Biochemistry and Food Processing and Preservation 3. Food Processing and Preservation 4. Fundamentals of Biochemistry and Food Processing and Preservation

SKILL ENHANCEMENT COURSE(SEC)			
Sl. No.	**Title of paper**	**Sl. No.**	**MANDATORY Naan Mudhalvan Scheme##**
1.	Food Hygiene and Sanitation	1.	**2nd Semester:**
2.	Early childhood care and Education		
3.	Palliative Care	2.	**3rd Semester:**
4.	Home science extension and Education		
5.	Customer Education	3.	**4th Semester:**
6.	Bakery and Confectionary (P)		
7.	Principles of Interior Design (P)	4.	**5th Semester:**
--		5.	**6th Semester:**

INTERDISCIPLINARY COURSE (IDC) FOR WHO HAVE OPT TAMIL AS PART-I (for other Department Students only)	
1st Semester	Food Microbiology
2nd Semester	Food Product Development
3rd Semester	Food Packaging
4th Semester	Sports Nutrition

INTERDISCIPLINARY COURSE (IDC)# FOR WHO HAVE NOT OPT TAMIL AS PART - I		
Those who have studied Tamil upto 10th+2 but opt for other languages in degree	1st Semester	Special Tamil - I
	2nd Semester	Special Tamil - II
Those who have not studied Tamil in school level	1st Semester	Basic Tamil - I
	2nd Semester	Basic Tamil – II
Those students who opt for either special Tamil (or) Basic Tamil as IDCs, have to choose 2 more IDCs courses in their 3rd and 4th Semester from Outside his/her department.		

INTERDISCIPLINARY COURSE (IDC) $$ FOR NCC CADETS ONLY	
NCC Course is a Compulsory Course for the NCC Cadets in the 3rd Semester:	**NCC Course is a Compulsory Course for the NCC Cadets in the 4th Semester:**
Introduction to NCC	1. Special Subject Army **(or)** 2. Special Subject Navy **(or)** 3. Special Subject Air force
Those students who opt for NCC Courses as IDCs, have to choose 2 more IDCs courses in their 1st and 2nd Semester from Outside his/her department.	

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMMES

Sl. No.	Part	Types of the Courses	No. of Courses	Credits for each Course	Total Credits	Marks
1.	I	Ability Enhancement Course	4	3	12	400
2.	II	Ability Enhancement Course	4	3	12	400
3.	III	Core Course	11	4	44	1100
4.		Core Practical	5	4	20	500
5.		Allied Course (AC)	4	4	16	400
6.		Allied Course Practical (AP)	2	4	8	200
7.		Core Project Work (CPW)	1	4	4	100
8.	IV	Skill Enhancement Course (SEC)	7	2	14	700
9.		Interdisciplinary Course (IDC)	4	2	8	400
10.		Value Education	1	2	2	100
11.		Health and Wellness	1	1	1	100
12.		Introduction to Disaster Management	1	2	2	100
13.		Summer Internship / Industrial Activity	1	2	2	100
14.		Value Added Course	1	1	1	100
15.		Environmental Studies	1	2	2	100
16.		Gender Studies	1	1	1	100
17.		**EXTENSIONACTIVITIES** (NCC / NSS / SPORTS / ANTI DRUG CELL / YRC & Any Other Activities	--	1	1	--
Total			**49**	**-**	**150**	**4900**

$ For those who have studied Tamil upto 10th+2 (Regular Stream)

\+ Syllabus for other Languages should be on par with Tamil at degree level

\# Those who have studied Tamil upto 10th+2 but opt for other languages in degree level under Part –I should study special Tamil and those who have not studied Tamil in the school level should study Basic Tamil in Part– IV under the Interdisciplinary Course.

** Examination at the end of the next semester

Naan Mudhalvan Scheme: As per the Naan Mudhalvan Scheme instructions, 5 courses from 2nd to 6th semester should be studied under Skill Enhancement Course.

$$ NCC Course is one of the Choices in the Interdisciplinary Course. Only the NCC Cadets are eligible to choose this course. However, NCC Course is a Compulsory Course for the NCC Cadets.

@ **Health and Wellness: Assessments:**

- Use self-reflective worksheets to assess their understanding
- submit the worksheets to internal audit / external audit
- Every student's activity report should be documented and the same have to be assessed by the Physical Director with Mentor. The evaluation should be for 100 marks. No examination is required.

Scheme of Evaluation:

Part	Description	Marks
A	Report	40
B	Attendance	20
C	Activities (Observation During Practice)	40
Total		**100**

@@ **Summer Internship / Industrial Activity**

Internship will be carried our during the summer vacation after the second year. Viva-Voce will be conducted by the college and Marks shall be send to the University and the same will be included in the 5th semester Mark Statement.

Summer Internship / Industrial Activity& Project Work

Scheme of Evaluation:

Description	Marks
Report	80
Viva-Voce	20
Total	**100**

* Extension Activities shall be outside instruction hours.

PROGRAMME OUTCOMES

PO 1	**Communication Skill:** Mandatory language courses facilitate to become proficient in communication, culturally aware, and more employable in both Indian and global contexts. Improve presentations skill, debates, and professional communication.
PO 2	**Disciplinary Knowledge:** Learn in-depth complex scientific concepts, demonstrate their ability to explain and apply their knowledge. Consistent in learning by earning extra credits in specialized courses within the science domain and enhance disciplinary knowledge.
PO 3	**Critical thinking:** Field and academic visits will help students to develop observation skills, grasping ability, collect and interpret data and propose models that will help them to understand hypotheses and conclusions.
PO 4	**Analytical Reasoning:** Through the interactions, students will develop skills of critical reading of texts, identifying gaps in knowledge, formulating scientific questions, and on will recognizing the synthesis of new ideas.
PO 5	**Scientific Reasoning:** Skill oriented courses will provide details on principles, conduct of proper calibration and use of scientific instrumentation and appropriate use of scientific techniques in experimental design
PO 6	**Self-directed Learning:** Preparation of field reports helps them to present their results and discussion in a written format that is typically required for their future professions.
PO 7	**Reflective Thinking:** All core courses with laboratory components will provide exposure to a wide range of research techniques, therein enhancing their understanding of the application of techniques in their domain.
PO 8	**Problem Solving:** Students will develop the ability to reason, apply numerical concepts, and equations in their fields of study for interpreting scientific data and drawing relevant scientific conclusions.
PO 9	**Research-related Skills:** Students undertaking a internship will have the opportunity to design, develop and execute their own research ideas in their experiments, thus expanding their knowledge of research methods and laboratory skills.
PO 10	**Lifelong Learning:** Ability to understand the gaps in knowledge and skill, adapt to technological change, engage in self-directed learning.

First Year **CORE COURSE 1** **Semester I**

Code: **FOOD SCIENCE** **Credits 4**
(Theory)

COURSE OBJECTIVES:
To enable the students to

- Understand the classification of foods according to their functions.
- Gain knowledge on the composition and nutritive value of foods.
- Aware about the basics cooking methods.
- Analyse the composition, processing, and functional properties of foods
- Examine the quality characteristics of foods.

UNIT – I INTRODUCTION TO FOOD SCIENCE AND COOKING METHODS:
Definitions - Food Science, Food, Nutrients, Nutritional Status, Mal-nutrition- Under – nutrition, over nutrition, Balanced diet, Hunger- Hollow Hunger, Hidden Hunger, Health, Meal, Menu. Food Groups - Basic five, My Plate, Nutritional classification of foods – Energy yielding, Body building and Protective foods. Cooking - Objectives, cooking methods- Moist and Dry heat methods of cooking, merits and demerits. Microwave cooking, ohmic cooking, induction cooking and solar cooking.

UNIT – II CEREALS AND PULSES:
Cereals and Cereal products - Structure and Nutritive value of rice and wheat, Nutritional importance of millets– maize, jowar, ragi, bajra; Milling of rice and wheat; Parboiling of rice, Products of wheat and rice, Enrichment and fortification of cereals and flours, Batters and doughs; Malting of cereals. Pulses - Nutritive value, factors affecting cooking quality of pulses, germination – process, advantages. Nuts - Composition and nutritive value-toxins in nuts and oilseeds

UNIT – III VEGETABLES, FRUITS AND MILK:
Vegetables - Classification, Nutritive value; Pigments- fat soluble, water soluble; selection of vegetables, cooking of vegetables- changes during cooking, nutrient loss, effect of cooking on the pigments. Fruits - Classification, Nutritive value; Changes during ripening of fruits, enzymatic browning and prevention, storage. Milk and Milk Products - Composition and Nutritive value, Different types of milk, effect of heat, acid and enzymes on milk.

UNIT – IV EGG AND FLESH FOODS:
Egg - Structure, Composition and Nutritive value. Factors affecting coagulation and foam formation, testing freshness in egg- candling. Meat - Structure, composition, a list of different types of meat, cuts of meat, post mortem changes in meat, and tenderness of meat. Poultry - Composition and classification. Fish- Structure, composition, nutritive value, selection of fish.

UNIT – V FATS, SUGARS AND SPICES:

Fats and oils- composition, processing and refining of fats, refined oils, plasticity, hydrogenation, winterization. Smoking point, factors that lower smoking point, absorption of fat during cooking. Sugar- nutritive value, sugar related products, stages of sugar cookery, crystallization, factors affecting crystallization.

Spices and condiments - types and uses in Indian cookery, medicinal value.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Effect of cooking on the nutritive value of different foods. Food Sample Booklet. Develop games on food and nutrients

TEXTBOOKS:

1. Srilakshmi, B., (2010), Food Science, 6th edition New Age International (P) Limited, New Delhi.
2. Sunetra, R., (2007), Food Science and Nutrition, Oxford University Press, India.
3. Chandrasekhar, U., (2002), Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi.
4. Potter, N., and Hotchkiss, J.H., (1995), Food Science, 5th edition, Chapman & Hall, New York.

REFERENCES BOOKS:

1. Shakuntala, M. and Shadaksharaswamy. M., (2000), 2nd Edition, Foods, Facts and Principles, New Age International Pvt. Ltd., Publishers, New Delhi.
2. Brow, A., (2000), Understanding Food, Thomson Learning Publications,
3. Parker, R. (2000), Introduction to food Science, Delmer, Thomson Learning Co., Delma.
4. Mehas, K.Y. and Rodgers, S.L. Food Science and You, Mc Millan Mc Graw Company, New York, 2000.

E-REFRENCES:

1. https://www.pdfdrive.com/food-science-books.html
2. https://archive.org/details/textbookoffoodsc0000khad
3. https://himitepa.lk.ipb.ac.id/e-book/
4. www.fao.org
5. www.wfp.org

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to	
CO1	Identify the foods and classify them based on the basic V food group system
CO2	Define the foods and describe its structure
CO3	Demonstrate their ability in selecting the good food and reject those with low quality
CO4	Analyse the different nutrients present in a food
CO5	Compare the nutrients present in the different types of food and suggest the nutrient rich foods.
CO6	Apply food science principles to improve food quality, nutrient retention, food safety, and the preparation of nutritious meals.

Mapping with Program Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**
CO 1	3	3	1	1	2	2	2	2	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

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First Year **CORE PRACTICAL 1** **Semester I**

Code: **FOOD SCIENCE** **Credits 4**
(Practical)

GENERAL:

1. Different types of cereals, pulses, vegetables, fruits and nuts and oil seeds – Observation
2. Guidelines to be followed in laboratory.
3. Method of Measuring Ingredients.
4. De-monstration of Cooking Methods.
5. Estimate the percentage of edible portion of foods.

PRACTICALS:

1. Microscopic examination of food starches before and after gelatinization - Rice, wheat, corn and tapioca
2. Gluten formation in different cereal flours- Wheat, Refined wheat flour, rice flour
3. Effect of different methods of making dough with other flour mixtures-Preparation of Chappathi, phulka
4. Effect of time, temperature and water required for sprouting whole pulses and legumes-Green gram, Bengal gram, cow pea and horse gram
5. Factors affecting cooking quality of pulses- Green gram dhal
6. Effect of heat and acid on the proteins of milk.
7. Effect of cooking time on the colour, texture and acceptability of whole egg; Formation of ferrous sulphide in boiling egg and its preventive measures.
8. Coagulation property of eggs.
9. Browning reaction in fruits and vegetables and its prevention methods
10. Effect of heat on vegetables.
11. Changes in pH during cooking of vegetables and fruits.
12. Determine the smoking point ofany4 cooking oils.
13. Stages of sugar cookery.

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to		
CO1	Identify the foods and classify them based on the basic V food group system	LO1
CO2	Define the foods and describe its structure	LO4
CO3	Demonstrate their ability in selecting the good food and reject those with low quality	LO5
CO4	Analyse the different nutrients present in a food	LO7 LO13
CO5	Compare the nutrients present in the different types of food and suggest the nutrient rich foods.	LO10 LO11
CO6	Apply food science principles to improve food quality, nutrient retention, food safety, and the preparation of nutritious meals.	LO6 LO15

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

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First Year **ALLIED COURSE I** **Semester I**

Code: **HUMAN PHYSIOLOGY (Theory)** **Credits 4**

COURSE OBJECTIVES:

To enable the students to

- Understand the structure and functions of various organs of the body
- Obtain a better understanding of the principles of nutrition through the study of physiology
- To gain knowledge on the importance of hormonal and nervous regulation of the body.

UNIT – I TISSUE AND BLOOD:

Cell and tissues - Structure of Cell and functions of different organelles. Classification, structure and functions of tissues. Blood - Constituents of blood- RBC, WBC and Platelets and its functions. Erythropoiesis, Blood clotting, Different Blood groups. Haemoglobin – Structure and functions; erthropoiesis, Blood coagulation, Reticulo-Endothelial System – Definition and functions, Lymphatic System.

UNIT – II CARDIO VASCULAR AND RESPIRATORY SYSTEM:

Heart and Circulation - Structure of heart and blood vessels; Properties of cardiac muscle, cardiac cycle, origin and conduction of heart beat; measurement of arterial blood pressure. Respiratory System - Structure of Respiratory organs; Sub – divisions of lung air; Mechanism of respiration.

UNIT – III DIGESTIVE AND EXCRETORY SYSTEM:

Digestive System - General Anatomy; Digestion in the mouth, stomach and intestines. Movements of the intestine; Role of Liver and Pancreas – Structure and Functions. Excretory system - Physiology of the Urinary System- Structure of kidney and nephron; Formation of urine, micturition. Skin – Structure and function of skin.

UNIT – IV ENDOCRINE AND REPRODUCTIVE SYSTEM:

Endocrine System - Structure and functions of thyroid, pituitary, parathyroid, adrenals, islets of langerhans of pancreas. Reproductive System - Anatomy of the male and female reproductive organs; menstrual cycle, Development of Embryo; Pregnancy and parturition.

UNIT – V NERVOUS SYSTEM AND SENSE ORGANS:

Nervous System - General classification of nervous system , Structure of nerve cell and Spinal cord; Basic Knowledge of different parts of the brain – anatomy and functions of cerebrum, cerebellum and medulla oblongata. Sense Organs - Structure and function of eye, ear, physiology of taste and smell.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Write an assignment on Artificial respiration and ECG. Develop E content on Structure and physiological functions of any one organ.

REFERENCES:

1. Sembulingam, K. (2000). Essentials of Medical Physiology. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
2. Saradhasubrahmanyam and MadhavanKutty, (2020). Text book of Human Physiology. S.Chand Publication.
3. Chatterjee C.C (2004). Human Physiology. Volume I. Medical Allied Agency. Kolkata.
4. Chatterjee C.C (2004). Human Physiology/ Volume II. Medical Allied Agency. Kolkata.
5. Gillian Pocock, Christopher D. Richards, David A. Richards (2018). Human Physiology. oxford University Press. (5th ed).
6. Lauralee Sherwood (2015). Human Physiology: Cells to systems. Cengage Learning.
7. H S Ravi Kumar Patil, H. K. Makari, H. Gurumurthy, S. V. Sowmya, (2009). A text book of Human Physiology. I.K. International Publishing House Pvt. Limited.
8. Guyton and Hall (2000). Textbook of Medical Physiology. Saunders. States of America.
9. Wilson, Ross (2014). Anatomy and Physiology in Health and Illness. Reed Elsevier India Private Limited. New Delhi.
10. Murugesh. N (2011). Anatomy and Physiology. Sathya Publishers. Madurai.
11. Chaudhri, K. (1993). Concise Medical Physiology, New Central Book Agency Ltd., Calcutta.
12. https://egyankosh.ac.in/handle/123456789/81726
13. https://tripurauniv.ac.in/
14. https://nwtc.libguides.com/
15. https://palmbeachstate.libguides.com/

COURSE OUTCOMES: (With Mapping)

At the end of the course, the students will have the ability to		
CO1	Outline composition and functions of blood	LO1
CO2	Interpret anatomy and physiology of circulatory and respiratory system	LO4
CO3	Discuss regulation of digestive and excretory system	LO5
CO4	Relate structure and functions of endocrine and reproduction system	LO7 LO13
CO5	Explain the structure, functions of nervous system and sense organs	LO10 LO11
CO6	Interrelate the functions of organs	LO6 LO15

Mapping with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

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First Year **ALLIED COURSE PRACTICAL 1** **Semester I**

Code: **HUMAN PHYSIOLOGY AND FOOD CHEMISTRY (Practical)** **Credits ****

COURSE OBJECTIVES:

To enable the students to

- To acquire knowledge on cellular arrangements and blood components.
- To learn methods to be adopted for the measurement of various blood parameters

PRACTICALS:

1. Histology of Tissues - Columnar, cubical, ciliated, squamous, stratified squamous.
2. Microscopic structure of organs - lungs, artery, vein, stomach, ovary, testis, uterus, pancreas.
3. Histology of muscles - cardiac, striated, non -striated
4. Estimation of Haemoglobin, Bleeding time, Clotting time
5. Measurement of Blood pressure using Sphygmomanometer.
6. Determination of Pulse rate using Pulsoximeter.
7. Blood smear preparation and staining procedure
8. Determination of Blood group and Rh factor.
9. Enumeration of Red blood cells.
10. Enumeration of White blood cells.
11. Demonstration of differential count of leucocyte.

REFERENCES:

1. G.K.Pal and Parvati Pal (2016). Textbook of practical physiology. Universities press(India) private limited.
2. Sembulingam, K. (2000). Essentials of Medical Physiology. Jaypee Brothers Medical Publishers (P) Ltd.New Delhi.
3. Chatterjee C.C (2004). Human Physiology Volume I. Medical Allied Agency. Kolkata
4. Saradha Subrahmanyam and K. Madhavan Kutty (2020). Text book of Human Physiology. S. Chand Publication.
5. Gillian Pocock, Christopher D. Richards, David A. Richards (2018). Human Physiology. (5th ed) Oxford University Press
6. Lauralee Sherwood (2015). Human Physiology: Cells to systems. Cengage Learning.

COURSE OUTCOMES: (With Mapping)

CO1	Identify cells present in the body
CO2	Describe cellular arrangement in tissues and organs
CO3	Articulate the methods to be adapted for the measurement of various blood parameters
CO4	Explain cellular arrangement in tissues and organs
CO5	Appraise number of cells present in blood.
CO6	Demonstrate the different forms of cell count in blood

Mapping with Program Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

First Year INTERDISCIPLINARY COURSE 1 Semester I

Code: FOOD MICROBIOLOGY Credits 2
(Practical)

COURSE OBJECTIVES:
To enable the students to

- Know the basics of food microbiology and understand the important genera of microorganisms associated with food and their characteristics.
- Identify and recognize the methods of isolation and cultivation of microbes
- Identify and differentiate the sources of Microorganisms in foods.
- Understand the role of microbes in disease progression of food borne illness
- Learn, Solve and apply the simple preservation methods.

UNIT – I INTRODUCTION TO FOOD MICROBIOLOGY:
Introduction and scope of food microbiology; Growth of microorganisms, General characteristics of bacteria, fungi, virus, protozoa, and algae; Intrinsic Factors (Substrate Limitations)-nutrient content, pH and buffering Capacity, redox potential, Eh, antimicrobial barriers and constituents water Activity; Extrinsic Factors (Environmental Limitations)-relative Humidity, temperature, gaseous atmosphere.

UNIT – II MICROBIOLOGY OF PLANT BASED FOODS:
Outline of contamination and spoilage of vegetables and fruits; cereals and cereal products; pulses, nuts and oilseeds; sugar and sugar products

UNIT – III MICROBIOLOGY OF ANIMAL BASED FOODS:
Outline of Contamination and spoilage of milk and milk products; canned foods; meat and meat products; egg, poultry and fish

UNIT – IV FOOD INTOXICATION AND FOOD INFECTION:
Food Borne Diseases – classification- intoxication – botulism and staphylococcal intoxication- infection – salmonellosis, clostridium perfringens illness, bacillus cereus, E. coli, shigellosis, Yersinia and streptococcus faecalis – foods involved, diseases outbreak, preventive and control measures

UNIT – V APPLICATIONS OF MICROORGANISMS IN FOODS:
Food Product-Alcoholic drinks, Dairy products (yoghurt, butter milk, and cheese), Bread, Vinegar, Pickled foods, Mushrooms, Single-cell protein; Products from microorganisms-Enzymes, Amino acids, Antibiotics, Citric acid; Indian fermented foods -mechanism of fermentation, effect on nutritional value; Fermentation of vegetables and fruits Fermentation of meat and fish. Cereal based fermented foods, cereal & Pulse based fermented foods

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Observation of spoiled foods under Microscope. Virtual tour of brewery industry.

TEXT BOOK:

1. MO Moss & MR Adams Food Microbiology (2008) New Age Publishers ISBN 8122410146
2. Ramesh Singh Food Microbiology (2021) MJP Publishers ISBN 8180940195
3. FOSTER W.M Food Microbiology (2020) CBS Publisher ISBN 8123928297
4. Annak. Joshua, (2001). Microbiology, Popular Book Depot. Chennai-15.

REFERENCE BOOK:

1. Frazier William C and Westhoff, Dennis C. Food Microbiology, McGraw Hill Education; Fifth edition 2017 ISBN 9781259062513
2. Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000
3. Garbutt, John. Essentials of Food Microbiology, Arnold, London, 1997.Banwartt: Food Microbiology
4. Pelczar MJ, Chan E.C.S and Krieg, Noel R. Microbiology, 5th Ed., TMH, New Delhi, 1993.

E-Resources:

1. http://nuristianah.lecture.ub.ac.id/
2. https://guides.library.iit.edu/
3. https://onlinelibrary.wiley.com/
4. https://www.microbes.info/
5. www.microbeworld.org/

COURSE OUTCOMES: (With Mapping)

CO1	Understand different terminology related to role and significance of microbial inactivation, adaptation and environmental factors on growth and response of microorganisms in various environments
CO2	Analyse and describe the microbial pathogens in food - Cereals and Pulses
CO3	Recognize and realize the Microbiology of fruits and vegetables
CO4	Discover and understand the Microbiology of Specific foods
CO5	Learn and understand the role of microbes in industrial applications
CO6	Recent applications of microorganisms in foods:

Mapping with Program Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**
CO 1	3	3	1	1	-	2	2	-	2	2
CO 2	3	3	2	2	2	2	1	1	2	2
CO 3	3	3	2	2	2	3	1	1	1	1
CO 4	3	3	2	2	1	3	2	1	1	1
CO 5	3	2	2	1	1	2	2	1	2	2
CO 6	3	3	3	2	2	3	2	2	3	2

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