HINDUSTAN
INSTITUTE OF TECHNOLOGY & SCIENCE
(DEEMED TO BE UNIVERSITY)

B. Sc. FOOD SCIENCE, NUTRITION, AND DIETETICS

(Duration: 3 Years)

CURRICULUM and SYLLABUS

(Applicable for Students admitted from Academic Year 2021-22)

DEPARTMENT OF FOOD TECHNOLOGY

SCHOOL OF LIBERAL ARTS AND APPLIED SCIENCES

HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE

B.Sc. – FOOD SCIENCE, NUTRITION and DIETETICS									
(110 CREDIT STRUCTURE)									
SEMESTER – I									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	BS	ELA4105	Communicative English	3	0	0	3	0	3
2	BS	CYA 1107	Environmental chemistry	3	1	0	4	0	4
3	PC	FNB 1101	Principles of Human Nutrition	3	1	0	4	0	4
4	BS	CYA 1106	Chemistry	3	1	0	4	0	4
5	BS	CYA 1151	Chemistry practical	0	1	2	2	0	3
6	BS	CSA 1152	Fundamentals of computers	0	1	2	2	0	3
Total				**12**	**5**	**4**	**19**	**0**	**21**
SEMESTER – II									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	FNB 1201	Food Microbiology	3	0	0	3	0	3
2	PC	FNB 1202	Nutritional Biochemistry	3	0	0	3	0	3
3	PC	FNB 1203	Human Anatomy & Physiology	3	1	0	4	0	4
4	PC	FNB 1204	Food Science	3	1	0	4	0	4
5	PC	FNB1231	Food Science practical	0	1	2	2	0	3
6	PC	FNB1232	Nutritional Biochemistry Practical	0	1	2	2	0	3
Total				**12**	**4**	**4**	**18**	**0**	**20**
TOTAL CREDITS									**110**

B.Sc. – FOOD SCIENCE, NUTRITION and DIETETICS									
(110 CREDIT STRUCTURE)									
SEMESTER – III									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	FNB 1301	Basic Dietetics	3	0	0	3	0	3
2	PC	FNB 1302	Nutrition in Life Cycle	3	1	0	4	0	4
3	PC	FNB 1303	Basics of food processing	3	1	0	4	0	4
4	PC	FNB 1304	Functional Foods and Nutraceuticals	3	1	0	4	0	4
5	PC	FNB 1331	Nutrition in Life Cycle Practical	0	1	2	2	0	3
6	PC	FNB 1332	Basic Dietetics practical	0	1	2	2	0	3
Total				**12**	**5**	**4**	**19**	**0**	**21**
SEMESTER – IV									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	FNB 1401	Biochemical Aspects of Nutrition	3	0	0	3	0	3
2	PC	FNB 1402	Food Preservation	3	0	0	3	0	3
3	DE	FNC 17**	Elective-I	3	0	0	3	0	3
4	DE	FNC 17**	Elective-II	3	0	0	3	0	3
5	PC	FNB 1431	Food Preservation Practical	0	1	2	2	0	3
6	PC	FNB 1432	Nutrition practical	0	1	2	2	0	3
7	PC	FNB 1433	Internship (minimum 40 hours)	0	0	0	2	0	0
Total				**15**	**2**	**4**	**21**	**0**	**21**
TOTAL CREDITS								**110**	

B.Sc. – FOOD SCIENCE, NUTRITION and DIETETICS									
(110 CREDIT STRUCTURE)									
SEMESTER – V									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	FNB 1501	Community Nutrition	3	0	0	3	0	3
2	PC	FNB 1502	Nutrition for health and fitness	3	0	0	3	0	3
3	PC	FNB 1503	Food Information & Regulations	3	0	0	3	0	3
4	DE	FNC 17**	Elective-III	3	0	0	3	0	3
5	DE	FNC 17**	Elective-IV	3	0	0	3	0	3
6	PC	FNB 1531	Community nutrition practical	0	1	2	2	0	3
7	PC	FNB 1532	Quantity cookery	0	1	2	2	0	3
Total				**15**	**2**	**4**	**19**	**0**	**21**
SEMESTER – VI									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PE	FNB 1603	Research Methodology	3	0	0	3	0	3
2	DE	FNC 17**	Elective-V	3	0	0	3	0	3
3	PC	FNB 1631	Project Work	0	0	16	8	0	16
Total				**6**	**0**	**16**	**14**	**0**	**22**
TOTAL CREDITS								**110**	

LIST OF PROFESSIONAL ELECTIVES WITH GROUPING - SEMESTER WISE									
SEM	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
4	DE	FNC 1711	Food Service Management	3	0	0	3	0	3
4	DE	FNC 1712	Value Addition to Food Industry Refuse	3	0	0	3	0	3
4	DE	FNC 1713	Fermented Foods	3	0	0	3	0	3
4	DE	FNC 1714	Food safety	3	0	0	3	0	3
5	DE	FNC 1715	Entrepreneurship Development	3	0	0	3	0	3
5	DE	FNC 1716	Food Quality Testing And Evaluation	3	0	0	3	0	3
5	DE	FNC 1717	Food additives	3	0	0	3	0	3
5	DE	FNC 1718	Food adulteration and toxicology						
6	DE	FNC 1719	Convenience foods	3	0	0	3	0	3
6	DE	FNC 1720	Introduction to food services	3	0	0	3	0	3

COURSE TITLE	COMMUNICATIVE ENGLISH			CREDITS	3
COURSE CODE	ELA4105	COURSE CATEGORY	BS	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Communication has always been important not only in man's life but also in the life of various living species. Man needs to communicate to express various needs feelings and emotions. He needs communication for the fulfillment of his emotional needs.
Course Objective	1. To enhance the learner's communication skills by giving adequate exposure in listening, speaking, reading and writing skills 2. To help the learners recognize and operate in various styles and registers in English. 3. To help the learner get rid of his present flaws and mistakes in pronunciation and grammar. 4. To help the learner identify and repair the voids in his present vocabulary and pronunciation targeting those specific arrays of words which create a barrier in his thought process. 5. To impart better writing skills by sensitizing the learners to the dynamics of effective writing.
Course Outcome	Upon completion of this course, the students will be able to 1. Acquire the basic knowledge of grammar and develop the knowledge of forming sentences in English 2. Discern technical communication and business communication 3. Comprehend from the visual observation and pictorial representations 4. Voice out their opinions and reacting to different circumstances 5. Lay a strong foundation on the vocabulary part of technical English skills

Prerequisites: ELA4105 - Communicative English

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	3	3	3
CO-2	3	2	2	2	3	3	3
CO-3	3	3	3	1	3	3	3
CO-4	2	3	1	1	2	2	1
CO-5	2	1	3	2	1	2	2

1: Weakly related, 2: Moderately related and 3: Strongly related	
MODULE 1: EXTENSIVE READING (9L+0T)	
Reading short meaningful extracts from literary and non-literary texts and identifying various types of connections among statements such as reason-result, statement-illustration, cause-effect, result-reason, addition, contradiction/opposite, introduction, furthering, adding, summing up, conclusion - Tracing the texture of texts — Referencing -- Anaphoric and cataphoric references — Identifying relationships between topic sentences and subordinate sentence	**CO-1 BTL-2**
MODULE 2: INTENSIVE READING (9L+ 0T)	
Matching discourse functions with corresponding linguistic structures — one function carried out through several structures — one structure fulfilling several functions - Cohesion and cohesive markers — Coherence and grammatical linkers -Reading newspapers at breakfast table — Reading publicity materials — Railway timetable — medical prescription — textbooks — cover letters accompanying important documents - Reading and Note making — Purposes of note making -- Various formats of making notes — Short forms and abbreviations — commonly used and personal conventions.	**CO-2 BTL-2**
MODULE 3: CRITICAL THINKING (9L+0T)	
Identifying differences and similarities between pairs of pictures, illustrations, diagrams etc. and talking about them by working in pairs and small groups - Defining 'argument' — Components of an argument: reason and conclusion —illustrating arguments — Identifying arguments from a set of statements and identifying their components	**CO-3 BTL-3**
MODULE4:ORAL COMMUNICATION SKILLS (9L+0T)	
Functions in clusters: Cluster 1. Inviting, responding with thanks, accepting invitation/declining - invitation with a valid reason. 2. Apologizing, explaining reason, promising not to repeat the mistake, reassuring, taking leave - 3. Correcting someone, defending the right point or stance, convincing the other etc - 4. Greeting, Appreciating something good, illustrating the point further, Complimenting - 5.Complaining, defending logically, demanding things to be set right, and producing proof or evidence	**CO-4 BTL-2**
MODULE 5: FUNCTIONAL GRAMMAR (9L+0T)	
Sentence – Parts of Speech – Comparative Adjectives - Pronouns – prepositions – conjunctions – Articles – Non-finite Verbs - tenses – conditionals – question tags – modal verbs – common errors – concord – Reported speech – Active & Passive voice	**CO-5 BTL-2**
TEXT BOOK	
1.	P. Bhaskaran (2018) ,Functioning in English Book I & II, Emerald Publishers. ISBN 978-8193704349.
REFERENCE BOOK	
1	Steve Hart et al, (2016) Embark, English for Undergraduates, Cambridge University Press. ISBN 9781316603611.
E BOOK	
1.	. https://www.britishcouncil.in/english/courses-business

COURSE TITLE	ENVIRONMENTAL STUDIES			CREDITS	4
COURSE CODE	CYA 1107	COURSE CATEGORY	BS	L-T-P-S	3-1-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Environmental studies is a multidisciplinary academic field which systematically studies human interaction with the environment. Environmental studies connect principles from the physical sciences, commerce/economics, the humanities, and social sciences to address complex contemporary environmental issues
Course Objective	1. To articulate the interconnected and interdisciplinary nature of environmental studies 2. To demonstrate an integrative approach to environmental issues with a focus on sustainability 3. To use critical thinking, problem-solving, and the methodological approaches of the food sciences, nutrition, and dietetics in environmental problem solving 4. To communicate complex environmental information to both technical and non-technical audiences 5. To understand and evaluate the global scale of environmental problems
Course Outcome	1. Understand environmental pollution and status 2. Assess pollution in air, water and soil 3. Analyze the ethical issues and Human Rights associated with it 4. Study of natural environmental factors 5. Elucidate the applications of chemical and microbial substances along with their impact on the environment

Prerequisites: CYA 1107 – ENVIRONEMTAL STUDIES

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3

CO-1	**2**	**1**	**1**	**2**	**1**	**2**	**1**
CO-2	**1**	**2**	**1**	**2**	**2**	**2**	**-**
CO-3	**2**	**2**	**1**	**1**	**1**	**1**	**1**
CO-4	**2**	**2**	**1**	**2**	**1**	**1**	**1**
CO-5	**2**	**1**	**1**	**2**	**1**	**2**	**1**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: ENVIRONEMNTAL RESOURCES AND ECOSYSTEM	**(9L+3T)**
Definition and Scope of Environmental Awareness, Need for Environmental Awareness Multidisciplinary nature of Environmental Studies--Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources, Role of an individual in conservation of natural resources.--Structure and functions of an ecosystem, Types, characteristic features, structure and functions of ecosystem.	**CO-1 BTL-2**
MODULE 2: BIODIVERSITY CONSERVATION	**(9L+3T)**
Definition and Types, Bio-geographical classification, Value of biodiversity, Importance of Biodiversity, Hotspots of Biodiversity, Western Ghat's Biodiversity in India, --Threats to Biodiversity, Conservation of Biodiversity--Source, impacts and measures for controlling pollutions, Municipal Solid waste: Present issues, challenges and management, Nuclear holocaust and hazards, Role of Individual in prevention of pollution.	**CO-2 BTL-2**
MODULE 3: SUSTAINABLE DEVELOPMENT	**(9L+3T)**
Case Studies, Environmental ethics, Acid rain, ozone layer depletion, Climate Change and Impacts on Environment, Global warming, Environment Protection Act--Population growth, variation among nations, Population explosion – Family Welfare Programme, Family Planning programme, Environment and human health, Human Rights, Value Education, Women and Child Welfare, Role of Information Technology in Environment and human health.	**CO-3 BTL-3**
MODULE 4: STUDY OF NATURAL SYSTEMS	**(9L+3T)**
Study of Soil System, Study of Water System, Study of Air System, Study of Noise, Ecological evaluation, Land as a resource, ecological and economic importance of soil; Soil formation; classification of soil; soil architecture; physical properties of soil; soil texture; soil water holding capacity; soil temperature; soil colloids; soil acidity and alkalinity; soil salinity and sodicity; soil organic matter; micronutrients of soil; nitrogen, sulphur, potassium, phosphorus economy of soil; soil biodiversity; soil taxonomy maps.	**CO-4 BTL-2**
MODULE 5: ENVIRONMETAL TOXICOLOGY	**(9L+3T)**
Chemistry of hydrocarbon decay, environmental effects, effects on macro & microorganisms - Pesticides: Classification, degradation, analysis, pollution due to	**CO-5 BTL-2**

pesticides – DDT & Endosulphan Heavy metals: Toxic effects of Cd, Pb & Hg. Fertilizers: micro and macro nutrients, environmental effects	
TEXT BOOK	
1.	Mahua Basu and Xavier Savarimuthu SJ (8 November 2017)- Fundamentals Of Environmental Studies- Cambridge University Press.
REFERENCE BOOK	
1	BK Sharma (2018) Environmental chemistry, 1st Edition, Krishna Prakashan Media (P) Ltd. ISBN 9788182836839.
E BOOK	
1.	https://www.fkit.unizg.hr/_download/repository/0387260617_Environmental_Chemis.pdf

COURSE TITLE	PRINCIPLES OF HUMAN NUTRITION			CREDITS	4
COURSE CODE	FNB 1101	COURSE CATEGORY	PC	L-T-P-S	3-1-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Principles of Human Nutrition provides an integrated overview of the physiological requirements and functions of protein, energy, and the major vitamins and minerals that are determinants of health and diseases in human populations
Course Objective	1. To describe the major global issues related to food and nutrition. 2. To describe current health promotion strategies and dietary guidelines 3. To demonstrate the ability to use diet analysis programs to determine nutrient intake. 4. To develop skills to conduct simple nutrition assessments to determine risk for malnutrition affected subject individuals. 5. To be able to answer questions concerning the effect of socioeconomic, psychological, and cultural factors on food intake.
Course Outcome	Upon completion of this course, the students will be able to 1. Evaluate nutritional requirements for regular life 2. Define calorie values present in the food 3. Suggest dietary requirements 4. Try to corelate the learn prospects with daily metabolism & deficiencies Analyze the therapeutical aspects of nutrients

Prerequisites: FNB 1101 – Principles of Human Nutrition

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	3	2	1	2	3	2	2
CO-2	3	2	1	2	3	2	2
CO-3	2	3	3	3	3	1	2
CO-4	2	3	2	1	3	1	2
CO-5	2	1	3	2	3	2	2

1: Weakly related, 2: Moderately related and 3: Strongly related	
MODUL1: NUTRITION AND DIETETICS-CARBOHYDRATES	**(9L+3T)**
Science of Nutrition, Concept of Nutrition- Definition of nutrition, health, nutritional status and malnutrition. RDA- Definition, factors affecting RDA and methods used for deriving RDA. Carbohydrates- Definition ,composition, functions, maintenance of blood sugar levels, requirement, sources, digestion and absorption; Dietary fiber- Definition, classification, physiological effects and sources.	**CO-1** **BTL-2**
MODULE 2: NUTRITION AND DIETETICS	**(9L+3T**
Proteins- Definition, composition, nutritional classification of proteins and amino acids, functions, sources, requirements, digestion and absorption. Evaluation of protein quality: PER, BV, NPU and Chemical score. Lipids- Definition, composition, functions, sources, requirements, digestion and absorption. Essential fatty acids – Definition, functions, sources and effects of deficiency.	**CO-2** **BTL-2**
MODULE 3: ENERGY METABOLISM	**(9L+3T)**
Energy- Definition, units of measurement, direct and indirect calorimetry; Determination of energy value of food, Total Energy requirement, Factors affecting physical activity, Factors affecting Basal Metabolic Rate, factors affecting Thermic effect of food, Recommended Dietary Allowances and Sources	**CO-3** **BTL-3**
MODULE 4: MACRO-MICRO NUTRIENTS	**(9L+3T)**
Macro Minerals- Calcium and Phosphorous: Functions, requirements, sources and effects of deficiency. Micro minerals- Iron, Iodine, Copper, Fluorine and Zinc: Functions, sources, requirements and effects of deficiency. Sodium and Potassium : Functions, sources, requirements and effects of imbalances.	**CO-4** **BTL-2**
MODULE 5: ENZYMES	**(9L+3T)**
Fat soluble Vitamins – Vitamin A, D, E and K: Functions, requirements, sources and effects of deficiency. Water Soluble Vitamins – Thiamine, riboflavin, niacin, ascorbic acid, folic acid, vitamin B6 and vitamin B12: Functions, requirements, sources and effects of deficiency.	**CO-5** **BTL-2**
TEXT BOOK	
1.	Bamji M S (2019) Textbook of Human Nutrition, 4th Edn, Oxford & IBH Publishing Co Pvt.Ltd, ISBN 9788120417908.
REFERENCE BOOK	
1	Sumathi R. Mudambi (2020) Fundamentals of Foods and Nutrition, 6th Edn., New Age International (P) Ltd, Publishers, ISBN 9788122433494.
E BOOK	
1.	https://www.anme.com.mx/libros/Principles%20of%20Human%20Nutrition.pdf

COURSE TITLE	CHEMISTRY			CREDITS	4
COURSE CODE	CYA 1106	COURSE CATEGORY	BS	L-T-P-S	3-1-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Chemistry is a subdiscipline of science that deals with the study of matter and the substances that constitute it. It also deals with the properties of these substances and the reactions undergone by them to form new substances. Chemistry primarily focuses on atoms, ions, and molecules which, in turn, make up elements and compounds. These chemical species tend to interact with each other through chemical bonds
Course Objective	1. To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective. 2. To provide students with the skills required to succeed in graduate school, the chemical industry 3. To expose the students to a breadth of experimental techniques using modern instrumentation. 4. To make them a analyze the learnt skills on chemical experiments. 5. To lay out a specific objective of performing a theoretical analysis for scientific approach.
Course Outcome	Upon completion of this course, the students able to 1. Understand basic concept of Inorganic chemistry 2. Get knowledge on refining of metal 3. Describe molecular mechanisms of chemical reactions 4. Learn the concepts pertaining to Surface chemistry & colloidal applications 5. Brief out the methodology adopted for metal extraction from their ores and thereby about their applications

Prerequisites: CYA 1106 CHEMISTRY

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	2	2	1

CO-2	**3**	**2**	**2**	**2**	**3**	**2**	**2**
CO-3	**3**	**3**	**3**	**1**	**3**	**3**	**3**
CO-4	**2**	**3**	**1**	**1**	**2**	**3**	**1**
CO-5	**2**	**1**	**3**	**2**	**2**	**1**	**3**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1:INORGANIC CHEMISTRY	**(9L+3T)**
Inorganic Chemistry - Atomic Structure, Periodic Properties, Redox Reactions-I , Chemical Bonding. Organic Chemistry - Structure and Bonding, Mechanism of Organic Reactions, Stereochemistry of Organic Compounds Alkanes & Cycloalkanes	**CO-1 BTL-2**
MODULE 2: MOSITURE & FOOD QUALITY	**(9L+3T)**
Moisture in foods-structure, properties, types of water in food & their specific action, water activity & stability. Introduction & significance of natural pigments in food.	**CO-2 BTL-2**
MODULE 3: SURFACE CHEMISTRY	**(9L+3T)**
Surface chemistry - Definition of colloids. Solids in liquids(sols), preparation, purification, properties - kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid. Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses.	**CO-3 BTL-3**
MODULE 4: METAL EXTRACTION	**(9L+3T)**
Extraction of Metals – Minerals and Ores – Difference – Minerals of Iron, Aluminum and Copper – Ore dressing or Concentration of Ore – Types of Ore Dressing – Froth Floatation and Magnetic separation. Refining of Metals – Types of Refining – Electrolytic, Van Arkel and Zone refining. Extraction of Thorium	**CO-4 BTL-2**
MODULE 5: REACTION MECHANISMS	**(9L+3T)**
Preparation and Properties of Cyclohexane. Baeyer Strain Theory. Polar Effects – Inductive effect, mesomeric effect and steric effect. (Acid and Base Strength). Stereoisomerism – Types, Causes of optical activity of lactic acid and tartaric acid. Geometrical isomerism – maleic and fumaric acid	**CO-5 BTL-2**

TEXT BOOK	
1.	F.A. Cotton, G. Wilkinson and P. Gans, (March-2021) Basic Inorganic Chemistry, John Wiley & Sons. ISBN 978-0-471-50532-7.
REFERENCE BOOK	
1	R.T. Morrison and R.N. Boyd, (2019) Organic Chemistry, 6th Edition, Prentice Hall, New Delhi. ISBN 978-0136436690.
E BOOK	
1.	Applied Chemistry Notes and Study Material PDF Free Download – BTech Geeks

COURSE TITLE	CHEMISTRY PRACTICAL			CREDITS	2
COURSE CODE	CYA 1151	COURSE CATEGORY	BS	L-T-P-S	0-1-2-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	1. To prepare students for their future careers in industry or research. 2. To help prepare for future careers in laboratories in industrial and other areas 3. To increase students' practical or laboratory experience/exposure/confidence. 4. To provide practical experience in the governing fields of chemistry. 5. To enhance students' practical laboratory skills and equipment/instrument use
Course Objective	Upon completion of the course the students will be able to: 1. Understand the properties of water based on their chemical and physical nature. 2. Apply the knowledge of acidity and alkalinity in various aspects of water constituents 3. Determine the factors associated with the water activities
Course Outcome	Upon completion of this course, the students able to 1. Understand basic concept of Inorganic chemistry 2. Get knowledge on refining of metal 3. Describe molecular mechanisms of chemical reactions 4. Learn the concepts pertaining to Surface chemistry & colloidal applications 5. Brief out the methodology adopted for metal extraction from their ores and thereby about their applications

Prerequisites: CYA 1151 CHEMISTRY PRACTICAL

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	3	2	3	2	2	1	2
CO-2	3	2	2	2	2	2	2
CO-3	3	3	3	1	3	3	1
CO-4	2	3	1	1	3	1	1

CO-5	**2**	**2**	**3**	**3**	**1**	**3**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

LIST OF EXPERIMENTS	**(3L+3P)**
1. Estimation of Hardness in water 2. Estimation of Alkalinity in water 3. Estimation of Acidity in water 4. Determination of Viscosity of Polymer 5. Estimation of Nickel in the given solution 6. Estimation of iron by spectrophotometry 7. Estimation of Dissolved oxygen by Winkler's method 8. Determination of COD	**CO-1,** **CO-2,** **CO-3,** **CO-4,** **CO-5** **BTL-2**

TEXT BOOK	
1.	J.Mendham, R.C. Denney, J.D. Barnes and N.J.K. Thomas (2018) Vogel's Textbook of Quantative Chemical Analysis, 8th Edition, Pearson Education. ISBN 9780582226289
REFERENCE BOOK	
1	Ashok kumar Aacharya (January 1-2018)- Experiments in Physical Chemistry, -Akinik Publications-1st Edition
E BOOK	
1.	https://mymission.lamission.edu/userdata/paziras/Chem101/Lab_Manual.pdf

COURSE TITLE	FUNDAMENTALS OF COMPUTERS			CREDITS	2
COURSE CODE	CSA 1152	COURSE CATEGORY	BS	L-T-P-S	0-1-2-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course includes generations of computer, evolution and development of microprocessor, input and output devices, primary and secondary storage devices, programming languages etc. It also deals with the hardware and software aspects of the computer like operating system, application software and system software
Course Objective	1. To learn basic principles of using Windows operation system. 2. To learn and practice basic keyboarding and mouse use. 3. To be able to access the Internet, Worldwide Web, as well as use Internet directories. 4. To expose the students to the depth of inbuilt skills on surfing technology 5. To make them be practical in all the applications for bright opportunities in the field of Information technology.
Course Outcome	Upon completion of this course, the students able to 1. Get introduced to the basics of computer including its architecture and peripherals 2. Acquire knowledge on operating system of Windows 3. Explore internet for day today life and professional development 4. Present the slides and improve their presentation skills using MS Power point 5. Avail the internet opportunity for surfing, learning Computer languages and communicate via internet

Prerequisites: CSA 1152 – Fundamentals of Computers

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	2	3	2
CO-2	3	2	2	2	2	2	2
CO-3	2	3	3	1	1	2	3
CO-4	2	2	1	1	1	2	2
CO-5	2	1	2	2	2	1	2

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION TO COMPUTER (3T+3P)

I/O devices – memories – RAM and ROM – Different kinds of ROM – kilobytes. MB, GB their conversions – large computer – Medium, Micro, Mini computers – Different computer languages – Number system – Binary and decimal conversions – Different operating system – MS DOS – Basic commands – MD, CD, DIR,TYPE and COPY CON commands – Networking – LAN, WAN,MAN(only basic ideas)	**CO-1** **BTL-2**
MODULE 2: TYPING TEXT-MS WORD	**(3T+3P)**
Manipulating text – Formatting the text – using different font sizes, bold, italics – Bullets and numbering – Pictures, file insertion – Aligning the text and justify – choosing paper size – adjusting margins – Header and footer, inserting page No's in a document Printing a file with options – Using spell check and grammar – Find and replace – Mail merge – inserting tables in a document	**CO-2** **BTL-2**
MODULE 3: TABLE CREATION-MS EXCEL	**(3T+3P)**
Cell editing – Using formulas and functions – Manipulating data with excel – Using sort function to sort numbers and alphabets – Drawing graphs and charts using data in excel – Auto formatting – Inserting data from other worksheets	**CO-3** **BTL-3**
MODULE 4: NEW SLIDE PREPARATION-MS-POWERPOINT	**(3T+3P)**
Inserting slides – slide transition and animation – Using templates – Different text and font sizes – slides with sounds – Inserting clip arts, pictures, tables and graphs – Presentation using wizards.	**CO-4** **BTL-2**
MODULE 5: INTERNET & ITS APPLICATIONS	**(3T+3P)**
Introduction to Internet – Using search engine – Google search – Exploring the next using Internet Explorer and Navigator – Uploading and Download of files and images – E-mail ID creation – Sending messages – Attaching files in E-mail – Introduction to "C" language – Different variables, declaration, usage – writing small programs using functions and sub – functions.	**CO-5** **BTL-2**
TEXT BOOK	
1.	Reema Thareja (2019)-Fundamentals of Computing
REFERENCE BOOK	
1	Norton P (2019) Introduction to computers, 7th Edn., Tata McGraw-Hill publishing company Ltd., New Delhi. ISBN 9789387067028.
E BOOK	
1.	https://www.researchgate.net/publication/258339295_FUNDAMENTALS_OF_COMPUTER_STUDIES

COURSE TITLE	FOOD MICROBIOLOGY			CREDITS	3
COURSE CODE	FNB 1201	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details		LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Food Microbiology is a study of interactions between food, microorganisms, and their environment to ensure food safety, quality, and value. Food Microbiologists also develop new and rapid methods to detect pathogenic and spoilage microorganisms in foods
Course Objective	1. To convey the scope of food microbiology and food safety 2. To provide knowledge about microorganisms associated with food and their characteristics 3. To introduce various techniques for enumeration and control of microorganisms in food 4. To provide the essential knowledge and applications of various techniques for preserving food
Course Outcome	Upon completion of this course, the students will be able to 1. Learn and understand types of microorganisms in foods 2. Know the methods of manufacture for vinegar, sauerkraut, yoghurt , soya sauce, wine and traditional Indian foods 3. Have sufficient knowledge of enumeration techniques & control of microorganisms in foods. 4. Realize the quality control measurements and Food Preservation techniques 5. Corelate the learnt concepts with Food Service establishments and total quality management

Prerequisites: FNB 1301 – FOOD MICROBIOLOGY

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	2	1	3
CO-2	3	2	2	2	1	2	2
CO-3	3	3	3	1	2	2	1

CO-4	**2**	**3**	**1**	**1**	**2**	**3**	**3**
CO-5	**2**	**1**	**3**	**2**	**2**	**3**	**1**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION TO FOOD MICROBIOLOGY (9L+0 T)	
History and Development of Food Microbiology, Definition and Scope of food microbiology Types of Microorganisms in Food: Classification and Nomenclature, Morphology and Structure Importance in food (bacteria, fungi and viruses) Significance of spores Microbial Growth in Food: Bacterial growth curve, Factors affecting the growth of micro-organisms in food.	**CO-1 BTL-2**
MODULE 2: MICROBIAL FOOD SPOILAGE (9L+ 0 T)	
Sources of Microorganisms in foods, Some important food spoilage bacteria, Spoilage of some specific food groups Food Fermentations: Fermentation definition and types, Microorganisms used in food fermentations, Fermented Foods-types, methods of manufacture for vinegar, sauerkraut, yoghurt , soya sauce, wine and traditional Indian foods	**CO-2 BTL-2**
MODULE 3: SPOILAGE OF DIFFERENT GROUPS OF FOODS (9L+ 0 T)	
Cereal and cereal products, vegetables and fruits, meats and meat products, fish and other sea foods, eggs, poultry, milk and milk products and canned foods. infections, Origin, symptoms and prevention of some commonly occurring food borne diseases	**CO-3 BTL-3**
MODULE 4 : CONTROL OF MICROORGANISMS IN FOODS (9L+ 0 T)	
Enumeration techniques, Qualitative and quantitative methods-conventional as well as rapid, Principles and methods of preservation (thermal and non-thermal), Introduction to Hurdle Technology, Introduction to Food Safety: Definition, Types of hazards, biological, chemical, physical hazards, Factors affecting Food Safety	**CO-4 BTL-2**
MODULE 5: HYGIENE AND SANITATION IN FOOD SERVICE (9L+0T)	
Introduction, Sources of contamination, Control methods using physical and chemical agents, Waste Disposal, Pest and Rodent Control, Personnel Hygiene, Food Safety Management Tools: Basic concept, Prerequisites, HACCP, ISO series, TQM and Risk Analysis	**CO-5 BTL-2**

TEXT BOOK	
1.	Adams MR (2018) Food Microbiology. New age publishers.
REFERENCE BOOK	
1	Arun Bhunia (2018) Fundamentals food microbiology. Bibik Publishers
E BOOKS	
1.	https://run.edu.ng/directory/oermedia/11934434415399.pdf

COURSE TITLE	NUTRITIONAL BIOCHEMISTRY			CREDITS	3
COURSE CODE	FNB 1202	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Nutritional Biochemistry and Metabolism is the study of nutrients and their metabolic functions. The course will provide an in-depth knowledge about how a clinical investigation of laboratory tests in humans (such as body fluids) are used for diagnosis of diseases and its therapeutic purposes.
Course Objective	1. To present a case for the essentiality of nutrients and energy in the diet 2. To introduce key themes of the sociology of health and illness 3. To establish the basic principles of metabolism and its regulation 4. To examine how metabolism is responsive to feeding and fasting 5. To explore the biochemical, physiological and clinical impact of inadequate intakes of specific nutrients
Course Outcome	Upon completion of this course, the students able to 1. Examine macro molecules level in foods-structure 2. Understand properties of macro molecules 3. Describe nutritional requirement for daily life 4. Elucidate the biochemical pathways in body metabolism 5. To implement the learnt concepts towards research and development in the field of nutritional biochemistry.

Prerequisites: FNB 1202 Nutritional Biochemistry

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	1	2	2	1	2	2
CO-2	3	2	2	2	2	2	2
CO-3	3	2	3	1	3	1	2
CO-4	3	3	1	1	1	1	2
CO-5	2	1	3	2	3	2	2

1: Weakly related, 2: Moderately related and 3: Strongly related	
MODULE 1: CARBOHYDRATES	**(9L+0T)**
Fundamentals of Biochemistry, Biological Membranes and Transport. Carbohydrates- Definition, classification. Structure (linear) of Monosaccharides- Glucose, fructose and galactose; Disaccharides- Maltose, lactose and sucrose; Polysaccharides- Starch and glycogen. Definition of Glycolysis, glycogenesis, glycogenolysis and gluconeogenesis. Metabolism- Glycolytic pathway, oxidation of pyruvic acid, Citric Acid Cycle. Pentose Phosphate Pathway	**CO-1** **BTL-2**
MODULE 2: LIPIDS	**(9L+0T)**
Lipids- Definition, classification and properties. Metabolism- Beta - Oxidation and biosynthesis of fatty acids. Cholestrol metabolism. Definitions- Ketone bodies, ketogenesis and ketosis.	**CO-2** **BTL-2**
MODULE 3: PROTEINS	**(9L+0T)**
Protein- Definition, classification, structure, physical properties, chemical properties and utilization. Amino acids- Types, Definition - deamination, transamination and decarboxylation. Urea production	**CO-3** **BTL-3**
MODULE 4: NUCLEIC ACID AND ETC POWER HOUSE	**(9L+0T)**
Introduction to genetic control of metabolism- Nucleic acids-Types, composition, structure, functions, replication. Elementary knowledge of biosynthesis of protein Electron transport chain and oxidative phosphorylation. Bioenergetics.	**CO-4** **BTL-2**
MODULE 5: ACIDS, BASES AND BUFFER SYSTEMS	**(9L+0T)**
Acid – base balance: Acid-base balance in normal health, definition of buffers, principles of buffers, major sources of acid produced in the body, physiological buffer system and role of different buffer systems. Fluid and electrolyte balance- Maintenance in normal health.	**CO-5** **BTL-2**
TEXT BOOK	
1.	David L Nelson and Michael M Cox (2017) Lehninger's Principles of Biochemistry, 6th edition, W. H. Freeman; 6th edition. ISBN 9781464109621
REFERENCE BOOK	
1	S.P. Singh (2018) Text book of Biochemistry, 6th edition, CBS Publishers & Distributors. ISBN 9788123927930**.**
E BOOK	
1.	Roger L. Miesfeld, Megan M. McEvoy, Biochemistry, W. W. Norton & Company, 2018, ASIN : B073K33TBR

COURSE TITLE	HUMAN ANATOMY & PHYSIOLOGY			CREDITS	4
COURSE CODE	FNB1203	COURSE CATEGORY	PC	L-T-P-S	3-1-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Anatomy and physiology is a course that will enable students to develop an understanding of the relationships between the structures and functions of the human body. Students will also learn the mechanisms for maintaining homeostasis within the human body.
Course Objective	1. To provide a course of study in mammalian, principally human, systems physiology, building on knowledge of basic physiological principles established in the Part IA Physiology of Organisms course; 2. To expand on some areas touched on in 1A Physiology of Organisms and to introduce new and more complex physiological functions; 3. To develop further practical biological skills introduced in 1A Physiology of Organisms; 4. To prepare students for a number of Part II Natural Science courses, principally Physiology, Development & Neuroscience, but also Pharmacology, Pathology and Zoology, among others. 5. To make students get exposed to medical research methodology on body mechanisms.
Course Outcome	Upon completion of this course, the students able to 1. Enable students to learn and understand clinical concepts associated with fundamentals of anatomy 2. Acquire knowledge pertaining to understand on the clinical aspects of basic human anatomy 3. Pursue an idea of the body internal circulatory, respiratory & Excretory systems and their mechanisms 4. Develop research knowledge so as to work with the metabolic pathways 5. Get an idea to link the nutritional prospects along with the study of Human Anatomy and Physiology

Prerequisites: FNB 1203 – Human Anatomy and Physiology

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	1	2	2

CO-2	**3**	**3**	**2**	**2**	**2**	**2**	**2**
CO-3	**3**	**3**	**2**	**1**	**3**	**1**	**2**
CO-4	**2**	**3**	**1**	**1**	**2**	**2**	**2**
CO-5	**2**	**1**	**3**	**2**	**1**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: CELL UNIT OF LIFE	**(9L+3T)**
CELL- Introduction - cell under e/m. Recent concepts.TISSUES- Classification, structure and function.	**CO-1 BTL-2**
MODULE 2: CONDUCTION OF NERVE IMPULSE	**(9L+3T)**
PHYSIOLOGY OF NERVE AND MUSCLE- Conduction of nerve impulses - Physiology of muscle contraction. NERVOUS SYSTEM-General anatomy of nervous system, functions of the different parts, reflexes, autonomic nervous system.SENSE ORGANS- Physiology of vision, hearing, taste', smell and cutaneous sensations.	**CO-2 BTL-2**
MODULE 3: BLOOD CIRCULATION	**(9L+3T)**
BLOOD - Composition, constituents, functions, wounds, hemorrhage, reticulo-endothelial system, body defence against diseases. HEART AND CIRCULATION-Anatomy of the heart-structure of .the heart and blood vessels, properties of cardiac muscle, origin and conduction of heart beat, cardiac cycle, cardiac output, heart sounds, blood pressure - definition and factors affecting blood pressure and ECG.	**CO-3 BTL-3**
MODULE 4: ORGAN SYSTEM PART- 1	**(9L+3T)**
RESPIRATORY SYSTEM - Anatomy and physiology of respiratory organs. Gaseous exchange in the lungs, mechanism of respiration. DIGESTIVE SYSTEM-Anatomy of gastro-intestinal tract. Digestion and absorption of carbohydrates, proteins, and fats.	**CO-4 BTL-2**
MODULE 5 ORGAN SYSTEM PART-2	**(9L+3T)**
EXCRETORY SYSTEM-Structure of kidney, formation of urine, acid-base balance, skin-temperature regulation, water balance. ENDOCRINOLOGY-Pituitary, thyroid, parathyroid, adrenal and pancreas - functions of the hormones and their relationships. REPRODUCTIVE SYSTEM-Anatomy of male and female reproductive organs, hormonal regulation of female reproductive function, menstruation, fertilization, pregnancy, lactation – hormone influence	**CO-5 BTL-2**

TEXT BOOK	
1.	Subramaniam S and Madhavan Kutty K (2020) The text book of Physiology, 1st Edn. S Chand & Company. ISBN 9788121902168.
REFERENCE BOOK	
1	Frederic H. Martini and Judi L. Nath (2018) Fundamentals of Anatomy and Physiology, 11th Edn., Pearson. ISBN 9780134396026.
E BOOK	
1.	https://textbookequity.org/Textbooks/anatomy+phys+vol2a.pdf

COURSE TITLE	FOOD SCIENCE			CREDITS	4
COURSE CODE	FNB1204	COURSE CATEGORY	PC	L-T-P-S	3-1-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Food Science is the study of the nature of foods, components of various food groups, their nutritional value, effect of processing on the nutrients , the causes of deterioration, the principles underlying food processing, and the improvement of foods for the consuming public.
Course Objective	1. To enable to enter a career in the food industry as scientists capable of ensuring the production and marketing of safe and quality foods. 2. Provide a broadly based scientific education whose graduates can also enter into employment in other sectors of the food chain or related scientific sectors where they can apply their scientific skills. 3. To allow individuals to develop their capacity to undertake research into the science of foods. 4. To provide undergraduates with opportunities to develop their inter-personal and communication skills. 5. To create a knowledge based skill towards research oriented aspiration.
Course Outcome	Upon completion of this course, the students will be able to 1. Knowledge on different types of nutritional foods 2. Examine on nutritional qualities of different foods 3. Elucidate the properties and processing of the derived products 4. Analyze the features and modifications during the processing of food products 5. Understand the essential and non-essential purposes of food additives

Prerequisites: FNB 1204 – Food Science

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	1	1	2	1	1	2
CO-2	3	2	2	2	2	3	2
CO-3	2	3	3	1	3	2	3
CO-4	2	2	1	1	1	2	3
CO-5	3	1	3	2	3	2	1

1: Weakly related, 2: Moderately related and 3: Strongly related	
MODULE 1: Cereals (9L+3T)	
NUTRIENT CONTENT OF FOODS - Classification of foods according to nutrient content. Food groups for balance diets - Food in relation to health. COOKING METHODS -Study of the different cooking methods, merits and demerits - solar cooking – Microwave cooking. CEREALS AND MILLETS – rice, wheat, ragi, bajra. Source of manufacture, structure, composition, storage.	**CO-1 BTL-2**
MODULE 2: PULSES, LEGUMES,FRUITS AND VEGETABLES. (9L+3T)	
PULSES- Source of manufacture, nutritive value, judicious combination of cereals and pulses, storage high-lighting soya beans, lathyrism - removal of toxins. VEGETABLES- Classification, colour, nutritive value, FRUITS -Classification, nutritive value, uses, preservation.	**CO-2 BTL-2**
MODULE 3: EGG AND MILK (9L+3T)	
EGGS- Structure and composition, nutritive value, palatability, methods of storage, preservation and uses in cookery. MILK AND MILK PRODUCTS-Nutritive value, cow's milk as compared with human milk, coagulation of milk, digestion of milk, milk products - whole and skimmed milk, milk powders and yogurt, ghee, butter, cheese.	**CO-3 BTL-3**
MODULE 4: MEAT AND MEAT PRODUCTS (9L+3T)	
Structure of meat, chicken ,Muscle Proteins, Contractile Proteins, Connective Tissues Composition of Meat, Classes of Meat - Beef, Mutton, Pork , Organ Meats , Sausages	**CO-4 BTL-2**
MODULE 5: SPICES AND SUGAR (9L+3T)	
SPICES AND CONDIMENTS-Origin, use in food preparation, excess consumption. Sugar- Different forms of sugar	**CO-5 BTL-2**
TEXT BOOK	
1.	B.Srilakshmi (2018) Food science, 7th Edison, New Age International Publishers. ISBN 9789386418890.
REFERENCE BOOK	
1	Janet D. Ward and Larry Ward (2018) Principles of food science, 4th Edison, The Goodheart-Willcox Company, Inc. ISBN 9781619604360.
E BOOK	
1.	https://www.pdfdrive.com/food-science-and-technology-d41395460.html

COURSE TITLE	FOOD SCIENCE PRACTICAL			CREDITS	2
COURSE CODE	FNB1231	COURSE CATEGORY	PC	L-T-P-S	0-1-2-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Objective	1. Apply and incorporate the principles of food science in practical, real- world situations and problems. 2. Demonstrate ability to use computers to solve food science problems. 3. Apply statistical principles to food science applications. 4. Apply the principles of food science to control and assure the quality of food products. 5. Explain the basic principles of sensory analysis.
Course Outcome	Upon completion of this course, the students able to 1. Able to learn and understand different cookery methods 2. Know the chemistry underlying the properties and reactions of various food components 3. Have sufficient knowledge of food chemistry to control reactions in foods. 4. Learn the biochemical reactions associated with the food components 5. Involve in creation of an innovative strategy in formation of some new variety products or combinations

Prerequisites: FNB 1231 – Food Science Practical

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	1	2	1
CO-2	3	3	2	2	3	2	2
CO-3	3	2	3	2	3	3	2
CO-4	2	3	1	1	2	3	1
CO-5	3	1	3	2	2	1	3

1: Weakly related, 2: Moderately related and 3: Strongly related

LIST OF EXPERIMENTS (3L+3P)

1. Starch cookery
a. microscopic structure of starch

b. Gelatinization and gluten formation
c. preparation of white sauce

2. Pulse cookery
a. cooking quality of pulse
b . pulse recipes

3. Egg cookery
a. Ferrous sulphide formation in boiled egg
b. Quality of poached egg.
c. Whipping quality of egg white

4. Vegetable and fruit cookery.
a. Enzymatic browning.
b. Vegetable and fruit recipe

5. Sugar cookery
a. Stages of sugar cookery

6. Fats and oils
a. smoking point of fats and oils.

7. Milk cookery.
a. coagulation of milk.

TEXT BOOK	
1.	Norman N Potter (2021) Food Science, 5th Edison, Springer. ISBN 9781461372639
REFERENCE BOOK	
1	B Srilakshmi (2018) Food Science, 6th Edison, New Age International Private Limited. ISBN 9788122438093.
E BOOK	
1.	https://www.pdfdrive.com/food-science-and-technology-d41395460.html

COURSE TITLE	NUTRITIONAL BIOCHEMISTRY PRACTICAL			CREDITS	2
COURSE CODE	FNB1232	COURSE CATEGORY	PC	L-T-P-S	0-1-2-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Objective	1. To develop skills of performing basic biochemical tests important in clinical investigations 2. To develop familiarity with biochemical laboratory techniques 3. To introduce students to various practical aspects of enzymology and their correlation in disease conditions. 4. To make them analyze and plan a nutritional chart accordingly. 5. To initiate a research based approach in the field of nutritional biochemistry.
Course Outcome	Know the major chemical reactions that limit shelf life of foods. 1. Know the principles behind analytical techniques associated with food. 2. Demonstrate practical proficiency in a food analysis laboratory. 3. Learn how to standardize various biomolecules. 4. 5. Separate carbohydrates by paper chromatography

Prerequisites: FNB 1231 – Nutritional Biochemistry Practical

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	3	1	2	3	2	3
CO-2	3	2	2	2	1	3	2
CO-3	3	2	3	1	2	2	3
CO-4	1	3	1	1	2	3	2
CO-5	3	1	3	2	3	2	1

1: Weakly related, 2: Moderately related and 3: Strongly related

LIST OF EXPERIMENTS (3L+3P)

1. Qualitative tests for sugars – glucose, fructose, lactose, maltose and glucose.
2. Quantitative estimation of reducing sugar.
3. Qualitative tests for proteins
4. Demonstration Experiments.

a. Estimation of total nitrogen in foods (Micro or Macrokjeldahl methods) b. Lipid extraction c. Determination of Iodine value 5. Estimation of urinary calcium 6. Estimation of urinary Phosphorous 7. Estimation of urinary Ascorbic Acid	
TEXT BOOK	
1.	Buthainah Al Bulushi**,** Raya Al-maliki, Musthafa Mohamed Essa (2019) Biochemistry Laboratory Manual for Undergraduate Students. ISBN 9781536149678.
REFERENCE BOOK	
1	S.P. Singh (2015) Text book of Biochemistry, 6^{th} edition, CBS Publishers & Distributors. ISBN 9788123927930.
E BOOK	
1.	http://rims.ruforum.org/12690A/chemistry-422-biochemistry-laboratory-manual.pdf

COURSE TITLE	BASICS OF FOOD PROCESSING			CREDITS	3
COURSE CODE	FNB 1301	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Basics of food processing deals with the various food processing techniques that are applied to various foods so that the processed food can be stored for future use without deterioration in quality and also to produce sustainable food to future.
Course Objective	1. To understand the history and evolution of food processing. 2. To study the structure, composition, nutritional quality and post harvest changes of various plant foods. 3. To study the structure and composition of various animal foods 4. To become familiar with the various processing methods 5. To know about the merits and demerits of various processing methods
Course Outcome	Upon completion of this course, the students will be able to 1. Apply the processing techniques for preserving foods 2. Compare the different processing methods for various foods 3. Reduction of food wastage by preserving 4. Prepare nutritious food with increasese in shelf life 5. Provide sustainable food for future

Prerequisites: FNB FOOD SCIENCCE

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	2	1	1
CO-2	1	2	2	2	1	2	2
CO-3	1	1	1	1	2	2	1
CO-4	2	1	1	1	2	1	-
CO-5	2	1	2	-	1	1	1

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: CEREAL PROCESSING (9L+0 T)

Milling of rice, wheat, maize, barley. products of rice, wheat and barley. Malting, break fast cereal, Uncooked -Breakfast Cereal, Ready-to-eat Cereal, Self-Raising Flour, All -Purpose Flour , Biscuit Flour Cake Flour Enriched Flour	**CO-1 BTL-2**
MODULE 2: PULSES (9L+ 0 T)	
Utilization of Pulses, Mature Seeds Fresh Seeds, Immature Pods, Toxic Constituents of Pulses, Lathyrism, Favism Elimination of Toxic Factors, Processed Soyabean Products Extracted Soyabean Proteins, Fermented Products of Soyabean, Fermentation, Pulse Protein Concentrates	**CO-2 BTL-2**
MODULE 3: OILS AND FATS (9L+ 0 T)	
Functions of Oil and Fats in Foods , Tenderness Flavour , Texture Emulsion Processing of Oil and Fats , Rendering, Pressing Solvent Extraction Refining Hydrogenation Vanaspati , Animal Fats, Butter , Lard , Margarine Vegetable Oils, Processing of Oilseeds for Food Use	**CO-3 BTL-3**
MODULE 4 : BEVERAGE PROCESSING (9L+ 0 T)	
Chemical Composition of coffee, Coffee Making, Soluble Coffee, Composition of Tea Preparation of Tea , Instant Tea , Herbal Tea, Tea Bags, Tea Sticks, Blended and Unblended Varieties, Cocoa, Production, Processing	**CO-4 BTL-2**
MODULE 5: PROCESSING OF FRUITS, DAIRY PRODUCTS (9L+0T)	
Dry Fruits, Jams. Jellies and Marmalades Jam, Jellies Marmalade, Milk Processing Clarification Pasteurization Homogenization, Vitamin D Milk Skim Milk Concentrated Milk Cream, Butter.	**CO-5 BTL-2**
TEXT BOOK	
1.	Manay S. (2018) Food facts and principles. New age publishers.
REFERENCE BOOK	
1	Srilakshmi B (2018). Food Science and Principles. New age publishers.
E BOOKS	
1.	https://run.edu.ng/directory/oermedia/11934434415399.pdf

COURSE TITLE	BASIC DIETETICS			CREDITS	4
COURSE CODE	FNB 1302	COURSE CATEGORY	PC	L-T-P-S	3-1-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Dietetics is a field of science that is concerned with diet and its effects on an individual's health. Dietetics focuses on food management through proper plan, monitoring and supervision of a patient's diet.
Course Objective	1. To provide Communicating skills, both verbally and in writing, with individuals, health 2. To provide skills necessary to become a dietician 3. To introduce the most up-to-date public health and scientific research on food, health and disease. 4. To give understanding of the conditions where nutrition plays a significant role in disease management. 5. To provide nutrition and dietetic care for individuals, groups and populations
Course Outcome	Upon completion of this course, the students will be able to 1. Understand basic concepts of diet therapy 2. Know the Diagnosis and management of food allergies 3. Have sufficient knowledge of Diet for Diabetes mellitus, Diet & nutrition in kidney diseases 4. Analyse the medical aspects of nutrition 5. Diagnose the complications & plan a dietary chart accordingly

Prerequisites: FNB 1302 – BASIC DIETETICS

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	1	2	2
CO-2	3	2	2	2	2	2	2
CO-3	3	3	3	1	3	1	2

CO-4	**2**	**3**	**1**	**1**	**1**	**1**	**2**
CO-5	**2**	**1**	**3**	**2**	**3**	**2**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: ROLE OF DIETICIAN (9L+3 T)	
The hospital and community, Basic concepts of diet therapy, Principles of diet therapy & therapeutic nutrition for changing needs. Concepts in Basic Dietetics, Nutritional Assessment, Nutritional care process, Modified hospital diets - Consistency and texture, modifications, Nutrient modifications	**CO-1 BTL-2**
MODULE 2: WEIGHT MANAGEMENT (9 L+ 3 T)	
Nutrition and Weight management, Eating disorders, Medical Nutrition Therapy for thyroid related disorders and poly cystic ovarian disease (PCOD), Nutrition, Immunity and Infection. Diet for Diabetes mellitus.	**CO-2 BTL-2**
MODULE 3: DIESEASES OF GASTRO INTESTINAL TRACT (9L+ 3 T)	
Diseases of Gastro Intestinal tract – Peptic ulcer, diarrhea, constipation, Celiac disease, Inflammatory bowel disease	**CO-3 BTL-3**
MODULE 4: DISEASES OF LIVER (9 L+ 3 T)	
Pathophysiology and Medical Nutrition Therapy of the Diseases of Liver, Gall bladder and Pancreas, Patho physiology and Medical Nutrition therapy for Rheumatic Disorders	**CO-4 BTL-2**
MODULE 5: DISEASES OF KIDNEY AND HEART (9 L+ 3 T)	
Nephritis, Nephrotic syndrome, Urolithiasis, Hypertension, Ischemic heart disease	**CO-5 BTL-2**

TEXT BOOK	
1.	Srilakshmi (2019) dietetics. New age publisher
REFERENCE BOOK	
1	Clinical dietetics manual (2018).Indian dietetic association
E BOOKS	
1.	https://www.pdfdrive.com/food-science-and-technology-d41395460.html

COURSE TITLE	NUTRITION IN LIFE CYCLE			CREDITS	4
COURSE CODE	FNB 1303	COURSE CATEGORY	PC	L-T-P-S	3-1-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course deals about the nutrition required during various stages of life in order to facilitate optimum growth. The nutrition requirements for reference man and women are dealt with.
Course Objective	1. To acquire knowledge on the nutritional needs of individuals at different age levels. 2. To develop basic concepts and gain experience in planning, preparing and serving of meals 3. To formulate menus for various age groups at different income levels based on nutritional status. 4. To develop personalized diet for individuals of different needs
Course Outcome	Upon completion of this course, the students will be able to 1. Analyze the nutritional requirements for different age groups that helps in controlling nutrition related deficiencies pertaining to such groups 2. Acquire the basic principles involved in meal planning for various age groups 3. Demonstrate basic skills in planning different kinds of menus for different age groups based on their recommended daily allowance. 4. Identify and plan meals taking into considerations different income groups 5. Learn to plan low cost diets that is balanced nutritionwise.

Prerequisites: FNB 1303- NUTRITION THROUGH LIFE CYCLE

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	2	1	3
CO-2	3	2	2	2	1	2	2
CO-3	3	3	3	1	2	2	1
CO-4	2	3	1	1	2	3	3

CO-5	**2**	**1**	**3**	**2**	**2**	**3**	**1**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: BASIC PRINCIPLES OF MEAL PLANNING (9L+3T)	
Basic principles of meal planning, RDA, food allowance for different age groups, factors influencing nutritional requirements for all age groups. .Nutrition during pregnancy – stages of pregnancy, physiological changes, weight gain in pregnancy, complications, factors influencing the outcome of pregnancy, nutritional requirements and diet planning for pregnant women.	**CO-1 BTL-2**
MODULE 2: NUTRITION DURING LACTATION (9L+3T)	
Nutrition for lactating women – Physiology and psychology of lactation, hormonal control, colostrum – composition, composition of breast milk, factors affecting the volume and composition of breast milk, nutritional requirements of a nursing mother, diet planning, factors responsible for lactation failure	**CO-2 BTL-2**
MODULE 3: NUTRITION DURING INFANCY (9L+3T)	
Nutrition in infancy – birth weight of infants, rate of growth, milestones in development (only stages), immunization schedule, nutritional requirements, process of breast feeding, superiority of breast milk, advantages of breast feeding, comparison of human milk with cow's milk, artificial feeding, weaning and supplementary foods, feeding problems.	**CO-3 BTL-3**
MODULE 4: NUTRITON DURING SCHOOL AGE (9L+3T)	
Nutrition in the school age children – growth in school children, nutritional and food requirement, packed lunch – factors to be considered, sample menu, feeding problems, diet plan for the school children. b. Nutrition in adolescence - growth and development, body composition, puberty, secondary sexual characteristics, psychological changes, nutritional requirements, nutritional problems, malnutrition due to early marriage, food habits and diet plan.	**CO-4 BTL-2**
MODULE 5: NUTRITION DURING ADULTHOOD (9L+3T)	
Nutrition for adulthood. Nutrition for elderly. Eating problems of elderly. Various disease conditions that affect elderly	**CO-5 BTL-2**

TEXT BOOK	
1.	Sri Lakshmi (2019) Dietetics. New age publishers.
REFERENCE BOOK	
1	Sri Lakshmi (2018). Nutrition Science. New age publishers.
E BOOKS	
1.	https://run.edu.ng/directory/oermedia/11934434415399.pdf

COURSE TITLE	FUNCTIONAL FOODS AND NUTRACEUTICALS			CREDITS	4
COURSE CODE	FNB 1304	COURSE CATEGORY	PC	L-T-P-S	3-1-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course deals with health promoting nutritional factors and bioactive constituents, their potential health implications and mechanisms of action. Also focus on potential health implications and mechanism of functional foods and discuss the applications of functional foods in the industry.
Course Objective	1. To provide students with an overview of the field of functional foods, nutraceuticals and natural health products. 2. To understand the functional food concept as related to ingredient efficacy and safety. 3. To familiarizes students with: examples of bioactive ingredient-disease relationships and the importance of clinical study support 4. To introduce the regulatory aspects of functional foods; and requirements for standards of evidence of efficacy for health claims; and market determinants of the functional food industry
Course Outcome	Upon completion of this course, the students will be able to 1.Understand History of functional foods 2. Know the Phytochemicals, phytosterols and other bioactive compounds 3. Have sufficient knowledge of Safety, and consumer acceptance 4.Understand the significance of functional food in health aspects 5. Realize the legal aspects associated with marketing strategies

Prerequisites: FNB 1304 – Functional Foods and Nutraceuticals

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	2	1	2
CO-2	3	2	2	2	2	2	2
CO-3	3	3	3	1	3	3	1
CO-4	2	3	1	1	3	1	1
CO-5	2	1	3	2	1	3	2

1: Weakly related, 2: Moderately related and 3: Strongly related	
MODULE 1: (9 L+3 T)	
History of functional foods, status of nutraceuticals and functional food market, definitions, difference between nutraceuticals and functional foods, types of nutraceutical compounds and their health benefits, Relevant terminologies – Enrichment, value addition, fortification, supplementation	**CO-1 BTL-2**
MODULE 2: (9 L+3 T)	
Cereal and cereal products, Milk and milk products, egg, oils, meat and products, sea foods, nuts and oilseeds, functional fruits and vegetables, herbs and spices, beverages such as tea and wine. Health benefits of functional foods	**CO-2 BTL-2**
MODULE 3: (9L+ 3 T)	
Types of nutraceutical compounds – Phytochemicals, phytosterols and other bioactive compounds, peptides and proteins, carbohydrates (dietary fibers, oligosaccharides and resistant starch), prebiotics, probiotics and symbiotic, lipids (Conjugated Linoleic Acid, omega-3 fatty acids, fat replacers), their sources and role in promoting human health.	**CO-3 BTL-3**
MODULE 4: (9L+ 3 T)	
Role of nutraceutical / functional foods in cardiovascular health, diabetes, obesity, immunity, age related muscular degeneration, stress management; Dosage levels; Adverse effects and toxicity of nutraceuticals	**CO-4 BTL-2**
MODULE 5: (9L+ 3 T)	
Stability of nutraceuticals. Safety, Consumer acceptance and assessment of health claims, labeling, marketing and regulatory issues related to nutraceuticals and functional foods.	**CO-5 BTL-2**
TEXT BOOK	
1.	(Subhadra M, 2020) Functional foods and nutrition. Daya publishing house
REFERENCE BOOK	
1	Danik M(2021) Functional foods and viral diseases.New age publishers
E BOOKS	
1.	https://www.pdfdrive.com/food-science-and-technology-d41395460.html

COURSE TITLE	NUTRITION IN LIFE CYCLE PRACTICAL			CREDITS	2
COURSE CODE	FNB1331	COURSE CATEGORY	PC	L-T-P-S	0-1-2-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Objective	1. To discuss and evaluate the roles of nutrition in the processes of pregnancy, lactation, child development, and aging. 2. To recognize, and discriminate between the relationship of nutrition and wellness and the course of child development and lifestyle related degenerative diseases. 3. To distinguish, adapt for, and design nutrition and wellness interventions which integrate the social-psychological influences on maternal and child development
Course Outcome	Upon completion of this course, the students able to 1. Understand Planning, preparing and serving a meal for low-income family 2. Know the Planning, preparing and serving a meal for a school going child 3. Have sufficient knowledge of Planning, preparing and serving a meal for an adult 4. Plan the diet based on the therapeutic conditions prescribed 5. Educate people or create awareness on dietary planning and practices

Prerequisites: FNB 1331 – Nutrition in Life Cycle

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	2	3	3	3
CO-2	3	2	2	2	2	3	3	3
CO-3	3	3	3	1	2	3	3	3
CO-4	2	3	1	1	2	3	3	3
CO-5	2	1	3	2	2	3	3	3

1: Weakly related, 2: Moderately related and 3: Strongly related

LIST OF EXPERIMENTS (3T+3P)

1. Display raw and cooked food materials according to exchange lists given below. Record their nutritive value. Milk exchange list, Meat exchange list, Pulse exchange list, Cereal exchange list, Vegetable-A exchange list, Vegetable-B exchange list, Fruit exchange list and Fat exchange list.
2. Prepare and display one serving of common cooked foods given below. Record their weight and nutritive value. Cereal preparations, pulse preparations, vegetable preparations, fried snacks, non-vegetarian preparations, bakery products, chutneys and sweets.
3. Planning, preparing and serving a meal for low income family, middle income family and high income family.
4. Planning, preparing and serving a meal for a pregnant woman in first second and third trimesters.
5. Planning, preparing and serving a meal for a lactating woman (0-6 months and 6-12 months).
6. (a). Planning, preparing and serving a meal for an infant.
   (b). Planning and preparing an indigenous weaning mixes.
7. Planning, preparing and serving a meal for a preschooler.
8. Planning, preparing and serving a meal for a school going child (a boy and a girl).
9. (a). Planning, preparing and serving a meal for an adolescent.
   (b). Planning and preparation of any five packed lunches.
10. Planning, preparing and serving a meal for an adult (sedentary, moderate and heavy worker).
11. Planning, preparing and serving a meal for an old age person.

TEXT BOOK

1.	Vimala (2020). Advances in diet therapy. New Age International Publishers, 2020.

COURSE TITLE	BASICS DIETETICS PRACTICAL			CREDITS	2
COURSE CODE	FNB1332	COURSE CATEGORY	PC	L-T-P-S	0-1-3-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Students will learn to formulate diet and calculate kilo calories for various therapeutic conditions. Based on the disease condition the required amount of nutrients will be modified
Course Objective	1. To introduce the basic principles involved in planning diets for different disease conditions. 2. To understand about the various metabolic alterations that occur during disease condition 3. To put into practice the theoretical knowledge into practice. 4. To learn the planning and preparation of diets for CVD, diabetes, hypertension, peptic ulcer, cancer and the like 5. To provide skill in calculating nutritive value for the planned and prepared diet
Course Outcome	Upon completion of this course, the students will be able to 1. Understand the basic concepts of diet planning 2. Understand the etiology for specific formulations 3. Formulate different diets based on the different needs of patients 4. Calculate the estimated calories 5. Perform sensory analysis of food

Prerequisites: FNB 1231 Food science practical

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	3	3	3	2	2	1
CO-2	3	3	2	1	3	3	1
CO-3	2	2	2	1	2	2	2
CO-4	2	3	2	2	2	1	1
CO-5	2	2	2	2	1	1	2

1: Weakly related, 2: Moderately related and 3: Strongly related

LIST OF EXPERIMENTS (3T+3P)	
1. Standardization of common food preparations. 2. Planning, preparation and calculation of following diets: a) High and low caloric diet b) Bland diet for gastritis and peptic ulcer c) Diet for Viral hepatitis and cholelithiasis d) Diet for Diabetes mellitus e) Diet for Hypertension and Atherosclerosis f) Diet for Nephritis and Nephrolithiasis g) Low and medium cost diets for protein energy malnutrition, Anemia and vitamin A deficiency	
TEXT BOOKS	
1	TK Indrani (2017), Manual of Nutrition and Therapeutic Diet. New age publishers.

COURSE TITLE	BIOCHEMICAL ASPECTS OF NUTRITION			CREDITS	3
COURSE CODE	FNB1401	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Biochemical aspects of nutrition deals with macro- and micronutrients with a limited focus on medical aspects of nutrient deficiencies and metabolism. It focuses on chemical structures, chemical properties, metabolism, and function of macro- and micronutrients.
Course Objective	1. Understand the importance of key terms related to nutrition, energy, macro nutrients, micro nutrients, water, electrolytes and their role in human health 2. To make students acquire detailed knowledge regarding the biological basis of nutrition and the mechanisms by which diet can influence health. 3. To impart basic understanding of metabolism, physiology, molecular genetics, epidemiology and biostatistics. 4. To make students attain skills in developing research proposals for the study of human nutrition. 5. To provide integration of knowledge about cellular and molecular biology, modern molecular genetics, and human physiology with concepts in nutritional sciences related to diet and disease.
Course Outcome	Upon completion of this course, the students will be able to 1. Learn and understand metabolism of microminerals 2. Have sufficient knowledge of nutrient interrelationships: Role of vitamins and minerals in macronutrient metabolism, micronutrient interrelationships. 3. Gains understanding about the importance of hydration status 4. Acquire knowledge about the deficiency diseases and toxicity caused by microminerals 5. Know the methods of measuring enzyme activities

Prerequisites: FNB 1202 Nutritional Biochemistry

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	2	2	1
CO-2	3	2	2	2	3	3	1
CO-3	3	3	3	1	2	2	2
CO-4	2	3	1	1	2	1	1

CO-5	**2**	**1**	**3**	**2**	**1**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: MICRO MINERALS 1 (9L+0 T)	
Metabolism of Microminerals: Functions, Biochemical importance, metabolism, deficiency, and toxicity of the following minerals: Calcium, phosphorus, magnesium.	**CO-1 BTL-2**
MODULE 2: MICRO MINERALS 2 (9 L+0 T)	
Metabolism of Microminerals: Functions, Biochemical importance, Metabolism, deficiency and toxicity of the following minerals: Iron, Zinc, copper, selenium, chromium, iodine, manganese, Molybdenum and fluorine.	**CO-2 BTL-2**
MODULE 3: HOMEOSTASIS (9 L+0T)	
Biomedical importance of enzymes, measurement of enzyme activities, physiological importance of isoenzymes, importance of water in human body, components of body fluid, functions, health effects due to water imbalance.	**CO-3 BTL-3**
MODULE 4: NUTRIENT INTER RELATIONSHIP (9L+0T)	
Nutrient-Nutrient interrelationships: Role of Vitamins and Minerals in macronutrient metabolism, micronutrient interrelationships.	**CO-4 BTL-2**
MODULE 5: ENZYMES (9L+0T)	
Enzymes-Definition, IUPAC classification of enzymes, factors affecting enzyme activity, Line weaver burk plot, Michaelis –Mention model, rate of enzyme activity, Inhibition of enzyme activity – feedback inhibition, allosteric inhibition	**CO-5 BTL-2**

TEXT BOOK	
1.	Satyanarayana.U (2020) Biochemistry, Elsevier publications
REFERENCE BOOK	
1	Seema P (2020) Biochemistry. DreamTech publications
E BOOKS	
1.	https://open.umn.edu/opentextbooks/textbooks/86

COURSE TITLE	FOOD PRESERVATION			CREDITS	3
COURSE CODE	FNB1402	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course gives a brief explanation of food structure and changes occurring in food during processing, and emerging technologies for processing, value addition of food, food products manufacture, preservation and shelf-life extension of perishable foods
Course Objective	1. To impart knowledge of various areas related to food processing and packaging. 2. To enable the students to understand food composition and its physic chemical, nutritional, microbiological and sensory aspects. 3. To familiarize the students about the processing and preservation techniques of variety of foods. 4. To emphasize the importance of food safety, food quality, food laws and regulations 5. To expose the students to different food processes used in industries and in research field
Course Outcome	Upon completion of this course, the students will be able to 1. Learn and understand principles of different food processing. 2. Know the methods of milling products and by products of wheat, rice, corn, barley, oats, sorghum and other millets. 3. Have sufficient knowledge on processing of milk and milk products for a sustaining its shelf life. 4. Gain knowledge about the various high temperature and low temperature preservation techniques to maintain the quality of food product

PREREQUISITES: FNB 1204 FOOD SCIENCE

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	3	2	2	1
CO-2	2	2	2	3	3	3	1
CO-3	3	3	2	2	2	2	2
CO-4	2	2	2	2	2	1	1
CO-5	2	2	3	3	1	1	2

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: BASIC PRINCIPLES OF COOKERY (9L+0T)	
Nature and properties of food, fluid and visco elastic behavior of foods, Principles of different food processing. Effect of food processing on nutritional properties of food. Importance of Food Preservation, Types of Spoilage, Basic Principles of Food Preservation.	**CO-1 BTL-2**
MODULE 2: PROCESSING OF CEREALS AND MILLETS (9L+ 0T)	
Milling products and by products of wheat, rice, corn, barley, oats, sorghum and other millets, whole wheat atta, blended flour, fortified flour, flaked, puffed and popped cereals, malted cereals, processed foods - bakery products, pasta products and value added products.	**CO-2 BTL-2**
MODULE 3: PROCESSING OF MILK AND MILK PRODUCTS (9L+0T)	
Milk – manufacture of different types of milk, drying of whole and skim milk, cream separation, churning of butter, processing of different types of cheese, Probiotic milk products - yoghurt, dahi and ice-cream, indigenous milk products - khoa, burfi, kalakhand, gulab jamun, rasagola, srikhand, channa, paneer, ghee, lassi.	**CO-3 BTL-3**
MODULE 4: PRESERVATION BY THE USE OF LOW AND HIGH TEMPERATURE (9L+0T)	
Preservation by the Use of Low temperature- Refrigeration, freezing Refrigeration, Advantages, Methods of Freezing, freeze drying and freeze concentration. Preservation by the Use of High Temperature - Drying, Dehydration, Sun Drying and Dehydration, Mechanical Dehydration, Spray drying, Canning, Pasteurization and Sterilization	**CO-4 BTL-2**
MODULE 5: PRESERVATION BY USING SUGAR CONCENTRATES, PRESERVATIVES AND FERMENTATION (9L+0T)	
Sugar Concentrates – Principles of Gel Formation, Chemical Preservatives – Definition, Role of Preservation, Permitted Preservatives, FPO Specification, Types of Fermentation, Common Fermented Foods, Wine making	**CO-5 BTL-2**
TEXT BOOKS	
1.	Srivatsava. (2019)Fruit and vegetable preservation-Principles and practice.CBS publishers
REFERENCE BOOKS	
1	Subbulakshmi M(2019). Food processing and Preservation. New age publishers
E BOOKS	
1.	https://www.pdfdrive.com/food-science-and-technology-d41395460.html

COURSE TITLE	FOOD PRESERVATION PRACTICAL			CREDITS	2
COURSE CODE	FNB1431	COURSE CATEGORY	PC	L-T-P-S	0-1-3-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Through this practical paper students gets hands on experience in preparing processed milk, cereal, vegetable and fruits products, so that they can start a unit on their own
Course Objective	1. To impart skills in involved in the processing of different foods 2. To provide experience in developing various food products 3. To impart knowledge on assessing the quality parameters of various food products 4. To identify processing and preservation techniques 5. To acquire skills to become an entrepreneur
Course Outcome	Upon completion of this course, the students able to 1. Learn about the processing of dry onion/chilli/garlic paste/potato powder 2. Acquire skill in preparing processed milk products 3. Learn about the preparation of value-added products 4. Become familiar with cultivation of mushrooms 5. Develop skills to become a entrepreneur

Prerequisites: FNB 1402 Basic preservation and Processing

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	3	3	2	2	2	2	1
CO-2	3	3	2	2	3	3	1
CO-3	3	3	3	2	2	2	2
CO-4	2	3	3	3	2	1	1
CO-5	3	1	1	1	1	1	2

1: Weakly related, 2: Moderately related and 3: Strongly related

LIST OF EXPERIMENTS (3T+3P)	
1. Preparation of Jellies 2. Preparation of Jams 3. Preparation of Marmalades 4. Preparation of pickle 5. Preparation of vadams – Rice and sago 6. Preparation of vathals – mango, brinjal, bittergourd	
TEXT BOOKS	
1.	Anil Kumar Anal (2018) Food Processing By-Products and their Utilization.Wiley-Blackwell Publications
REFERENCE BOOKS	
2	Xcess board of editors (2020), Opportunities in fruits, vegetables and agro processing industries. Xcess publications
E BOOKS	
1	http://download.poultryandmeatprocessing.com/v01/SciPoultryAndMeatProcessing%20-%20Barbut%20-%2018%20Byproducts%20and%20Waste%20-%20v01.pdf

COURSE TITLE	NUTRITION PRACTICALS			CREDITS	2
COURSE CODE	FNB1432	COURSE CATEGORY	PC	L-T-P-S	0-0-2-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course includes estimation of sugar, salt, fat content in the foods samples. It also includes the methods to estimate the acidity and alkalinity levels
Course Objective	To enable students 1 To learn basic principles of sugar analysis. 2 To learn and practice estimation of salt by titration 3 To be able to assess the level of starch in food samples 4 To analyze the various nutrients qualitatively as well as quantitatively 5 To become familiar with methods of nutrient analysis
Course Outcome	Upon completion of this course, the students will be able to 1 Evaluate nutritional qualities of foods 2 Estimate the calorie values of food 3 Perform qualitative and quantitative experiments to identify the constituents of food 4 Implement the pH and indicator analysis on food samples. 5 Avail the instrumental analysis for various food processing samples

Prerequisites: Basic chemistry

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	1	-	1	-	1	1	-
CO-2	-	1	-	-	-	-	1
CO-3	-	1	-	-	1	-	-
CO-4	2	-	-	1	-	-	-

CO-5	**-**	**-**	**1**	**-**	**-**	**-**	**1**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1
(0L+4P=2)

1. Qualitative estimation of reducing sugars 2. Qualitative estimation of minerals **Demonstration** 3. Quantitative estimation of calcium 4. Quantitative estimation of phosphorus 5. Quantitative estimation of vitamin C	**CO-1,BTL-2** **CO2,BTL--2** **CO-2,BTL-2** **CO-3,BTL-2** **CO-4,BTL-2** **CO-5, BTL-2**

TEXT BOOKS

1.	Dennis D Miller (2013) Food Chemistry: A Laboratory Manual. Wiley; 2nd edition.

REFERENCE BOOKS

1	Kan, Jianquan, Chen, Kewei (2012) Essentials of Food Chemistry, Springer Publications

COURSE TITLE	COMMUNITY NUTRITION			CREDITS	3
COURSE CODE	FNB 1501	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course deals about strategies and programs developed by governmental and non-governmental organizations to improve the dietary intake and the nutritional status of individuals and groups within a community. It also covers nutrition-related programs, for groups at nutritional risk, nutritional issues/ concerns across the lifecycle. Assessment and intervention of project and community service-learning component will provide students the opportunity to integrate and apply knowledge through a hands-on approach.
Course Objective	1. To enable the students, understand the role of nutrition in community development. 2. To provide the difference between food fortification and food supplementation. 3. To give an overview of advantages and disadvantages of methods used for improving the nutritional quality of food. 4. To familiarize the methods of imparting nutrition education at individual, community and large population. 5. To become familiar international and national health agencies
Course Outcome	Upon completion of this course, the students will be able to 1. Diminish malnutrition problems in the country by educating layman about good nutritional practices 2. Applying principles of epidemiology to nutrition by using vital factors 3. Assess the nutrition status of various stages of life cycle 4. Implement interventions to enhance nutritional status 5. Develop health policies and strategies that will help in nation development

Prerequisites: FNB1303 NUTRITION IN LIFE CYCLE

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	3	2	2	2	2	2	1
CO-2	2	1	1	3	3	3	1
CO-3	1	1	2	3	2	2	2

CO-4	**3**	**3**	**2**	**1**	**2**	**1**	**1**
CO-5	**3**	**2**	**2**	**1**	**1**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: ECOLOGY OF MALNUTRITION (9L+0T)	
Relation of nutrition to national development in terms of socio economic, industrial and agricultural development Consequences of malnutrition - reduced physical work capacity and mental efficiency, cost of wastage due to malnutrition in pregnancy, childhood etc IMR, NMR,MMR and prevalence of common nutritional problems- PEM, Vitamin A Deficiency Diseases, Anaemia, Iodine Deficiency Disorders and Fluorosis Ecological factors leading to malnutrition such as income, size of families, dietary pattern, occupation, customs food fads, fallacies, ignorance and other factors Synergism between malnutrition and infection	**CO-1 BTL-2**
MODULE 2: STRATEGIES TO OVERCOME MALNUTRITION (9L+0T)	
Measures to overcome malnutrition, increased agricultural production and animal husbandry with emphasis on nutritious foods and nutrition gardens, food technology, food fortification and enrichment, nutrition education, nutrition intervention programmes. Environmental sanitation and health. Empowering women towards improving the nutritional status of the family, community and nation at large	**CO-2 BTL-2**
MODULE 3: NUTRITION INTERVENTION PROGRAMMES (9L+0T)	
Genesis objectives and operation of nutrition intervention programmes in India – School Lunch Programme, CMNMP, ICDS, TINP organized by government for vulnerable sections of the population. National Nutritional Anaemia Prophylaxis Programme, National Prophylaxis Programme against Vitamin A Deficiency Diseases, Goitre Control Programme. National Nutrition policy- National food security, National nutrition policies.	**CO-3 BTL-3**
MODULE 4: NATIONAL ORGANISATION TO COMBAT MALNUTRITION (9L+0T)	
National Organization concerned with food and nutrition – ICMR, NIN, NNMB CFTRI, DFRL, and NIPCCD. International Organization concerned with Food and Nutrition- FAO, WHO, UNICEF, World Bank	**CO-4 BTL-2**
MODULE 5: NUTRITION EDUCATION (9L+0T)	
Meaning, nature and importance of Nutrition education to the community and lessons to be taught. Methods of education- use of audio-visual aids Use of computers to impart nutrition education – power point presentation, E- learning, **Organization of Nutrition education programmes:** Principles of planning, executing and evaluating nutrition education programmes, problems of nutrition education programmes **RELATED EXPERIENCE:** Mini Project in a rural or urban community focusing on women and children and preparation of a report	**CO-5 BTL-2**

TEXT BOOK	
1.	Suryapadas (2018) Textbook of community nutrition. Academic publishers.
REFERENCE BOOK	
1	Srilakshmi B (2020) Nutrition Science. New age publishers.

COURSE TITLE	NUTRITION FOR HEALTH AND FITNESS			CREDITS	3
COURSE CODE	FNB 1502	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Outlines the nutritional guidelines for optimal health and performance enhancement. Also discusses about the different types of assessment of body composition and plan diets for various sports events.
Course Objective	1. To make students understand the concept of fitness training 2. To improve the foster fitness skills 3. To help students prevent and manage lifestyle related disorders 4. To provide knowledge on exercise, stress and health management 5. To make students gain the technical ability to run fitness centers
Course Outcome	Upon successful completion of the course students shall be able to: 1. Understand the role of nutrients in athletic performance and to provide an overview of dietary supplements to enhance performance. 2. Explain how the principles of fitness and nutrition, complement each other in developing physiological well-being and overall health. 3. Identify some of the social and cultural influences on food habits and exercise/activity patterns. 4. Develop personalized nutrition plans and programs based on scientific principles and develop written goals, objectives, and detailed strategies 5. Gain insight into female specific issues relating to athletes and study the nutritional requirements of athletes with special needs.

Prerequisites: 1303 NUTRITION IN LIFE CYCLE

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PSO-1	PSO-2	PSO-3
CO-1	3	2	2	2	2	1
CO-2	2	2	2	3	3	1

CO-3	**2**	**2**	**3**	**2**	**2**	**2**
CO-4	**2**	**3**	**2**	**2**	**1**	**1**
CO-5	**3**	**2**	**3**	**1**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: HEALTH AND EXERCISE PHYSIOLOGY (9L+0T)	
Definition – challenges and personalized approach. Benefits of fitness training Pulmonary Structure and Function, Cardiovascular Regulation and integration, Skeletal and neural control, endocrines and exercise, role of macro and Micro nutrients, optimum nutrition	**CO-1 BTL-2**
MODULE 2: NUTRITI0N FOR PHYSICAL ACTIVITY (9L+0T)	
Aerobic and anaerobic training, Benefits of Fitness training and Gadgets for measuring PA – Motorized Treadmill, (aerobic Fitness), Functional Trainer, Fluid Rower (Upper body), Elliptical Bicycle and Bicycle Ergometer (Lower body), Stretch Trainer (Whole body), Multi Gym (9, 12, 16 station) for different muscle groups	**CO-2 BTL-2**
MODULE 3: SPORTS NUTRITION (9L+0T)	
Nutrition for strength sport athletes − Types and characteristics of strength or high intensity sports (sprinting, throwing, body building etc) − Physiology of energy systems, − Nutritional requirements- macronutrients- carbohydrates, fats proteins − Muscle building- post exercise anabolic window − Impact of resistance training on body composition of athletes in strength sports, micronutrient requirements.	**CO-3 BTL-3**
MODULE 4: DISEASES DUE TO FAULTY FOODHABITS AND PHYSICAL INACTIVITY (9L+0T)	
Life Style related diseases/ disorders Non-communicable Disease conditions- Underweight, Obesity, Diabetes mellitus, Hypertension, Cancer, Cardiovascular Disease, Anemia	**CO-4 BTL-2**
MODULE 5: EXERCISE HEALTH AND STRESS MANAGEMENT (9L+0T)	
Stress Assessment and Management Techniques-Exercise at medium and high altitudes, Underweight, Overweight and Obesity, Relaxation Techniques, Yoga and Meditation for Health, Clinical Exercise Physiology for Cancer, CV and Pulmonary rehabilitation	**CO-5 BTL-2**
TEXT BOOK	
1.	Srilakshmi (2019). Exercise physiology. New age publisher.
REFERENCE BOOK	
1	Geetanjali (2018). Nutritional guidelines for sports person. Jaypee Publishers.

COURSE TITLE	FOOD INFORMATION AND REGULATIONS			CREDITS	3
COURSE CODE	FNB1503	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course surveys the food laws and regulations as well as the socio-economic dynamic which shapes the food laws of specific regions of the world. This course will also cover the regulation of foods and food additives, dietary supplements, genetic modification regulation, HACCP, civil and criminal liability for defective products, inspections, labeling, importation and exportation, novel processing technologies regulation
Course Objective	1. To enable students, recollect the food safety system and quality attributes. 2. To comprehend the knowledge gained on food laws and food safety regulations at regional and national levels. 3. To impart knowledge on role of national and international agencies in establishing food standards. 4. To enable students to execute food laws and food safety standards in food service operations. 5. To provide experience to monitor and evaluate food laws and standards in food service industry
Course Outcome	Upon successful completion of the course students shall be able to: 1. Understand concepts of food quality and role of total quality management system in food industry 2. Assessments of quality of food products using various techniques 3. Understand the national & international food laws and regulations for quality of foods 4. Understand the standards of international regulatory bodies 5. Understand the concept and application of knowledge about food safety management system in food industry

Prerequisites: FNB1711 Food service management

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PSO-1	PSO-2	PSO-3

CO-1	**3**	**1**	**2**	**2**	**2**	**1**
CO-2	**3**	**3**	**2**	**3**	**3**	**1**
CO-3	**2**	**1**	**1**	**2**	**2**	**2**
CO-4	**1**	**3**	**2**	**2**	**1**	**1**
CO-5	**2**	**2**	**1**	**1**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INRODUCTION TO LAWS AND REGULATIONS (9L+0)	
Objective of Food Laws, Major Food Laws and Regulations of India and Regulation of Food Sanitation.	**CO-1 BTL-2**
MODULE 2: NATIONAL LAWS	**(9L+0)**
Prevention of food Adulteration Act (PFA), Fruit Product Order (FPO), Meat Product Order (MPO), Agmark, Bureau of Indian Standards (BIS), Food Safety and Standards Authority of India (FSSAI).	**CO-2 BTL-2**
MODULE 3: INTERNATIONAL LAWS (9L+0)	
Certification of HACCP, ISO, Codex Alimentarius, FDA, USDA, CARE	**CO-3 BTL-3**
MODULE 4: LABELING AND PACKAGING (9L+0)	
Packaging – Functions, Classifications, Material used for packing and laws related to packaging. Labeling – Nutrition Labeling, Labeling provisions in existing food laws.	**CO-4 BTL-2**
MODULE 5: FOOD ADULTERATION (9L+0)	
Definition – Methods to detect adulterant of various foods.	**CO-5 BTL-2**

TEXT BOOKS	
1.	Srilakshmi B (2020) Food Science. New Age Publishers
REFERENCE BOOKS	
1	Berryman P. (2019). Advances in Food and Beverage Labelling: Information and Regulations. Elsevier Publications.
E BOOKS	
1.	http://www.springer.com/gp/book/9783319124711

COURSE TITLE	QUANTITY FOOD PRODUCTION PRACTICAL			CREDITS	2
COURSE CODE	FNB1531	COURSE CATEGORY	PC	L-T-P-S	0-1-3-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Through Quantity food production practicals, students become trained in preparing bulk portions of food. They also learn to calculate the selling price by using various cost control methods
Course Objective	1. To learn about the settings of kitchen in hotel industry 2. To make students understand the use of various resources used in kitchen 3. To impart skill to handle commodities used in Food Production 4. To state the methods of cooking and apply the on various ingredients 5. Become aware about purchasing policies, and storage policies
Course Outcome	Upon completion of this course, the students able to 1. Acquire skill to prepare large portions of foods 2. Learn about the various methods of food cost estimation 3. Calculate profit and loss by including overhead cost, fluctuating cost 4. Develop leader ship skills 5. Gain confidence to become entrepreneurs

Prerequisites: FNB 1231 Food science practical

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	1	2	2	1
CO-2	3	3	2	2	3	3	1
CO-3	2	3	3	3	2	2	2
CO-4	2	3	2	2	2	1	1
CO-5	1	2	3	2	1	1	2

1: Weakly related, 2: Moderately related and 3: Strongly related

LIST OF EXPERIMENTS (3T+3P)

1.	Cereal Preparations: Rice Preparations: Chicken Biriyani, Vegetable Pulao, Tomato Rice. Wheat Preparations: Aloo Paratha, Spicy Potato Puri, Spring Roll.
2.	Vegetable Preparations: Gobi Manchurian, Vegetable Kuruma, Shahi Matter.
3.	Meat and Fish Preparations: Meat Preparations: Chicken Peggy Digo, Chicken curry, Green Chicken, Fish Preparations: Tomato Fish, Chilly Fish, Fish Moilee
4.	Snacks, Sweets, Puddings And Desserts: Snacks: Onion Pakoda, Rainbow Sandwich, Vegetable Burger Sweets: Carrot Burfi, Bread Gulab Jamun, Coconut Sweet, Puddings and Desserts: Chocolate Pudding, Bread Pudding, Fruit Triffle.
5.	Millet recipes like breakfast, snacks and dinner

TEXT BOOKS

1.	Thangam Philip (2018) Modern Cookery. Orient Blackswan Publications

COURSE TITLE	COMMUNITY NUTRITION PRACTICAL			CREDITS	3
COURSE CODE	FNB 1531	COURSE CATEGORY	PC	L-T-P-S	1-0-2-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The Practical course deals about strategies and programs to improve the dietary intake and the nutritional status of individuals and groups within a community. It also covers nutrition-related programs, for groups at nutritional risk, nutritional issues/ concerns across the lifecycle. Assessment and intervention of project and community service-learning component will provide students the opportunity to integrate and apply knowledge through a hands-on approach.
Course Objective	1. To enable the students, understand the role of nutrition in community development. 2. To provide the difference between food fortification and food supplementation. 3. To give an overview of advantages and disadvantages of methods used for improving the nutritional quality of food. 4. To familiarize the methods of imparting nutrition education at individual, community and large population. 5. To become familiar international and national health agencies
Course Outcome	Upon completion of this course, the students will be able to 1. Diminish malnutrition problems in the country by educating layman about good nutritional practices 2. Applying principles of epidemiology to nutrition by using vital factors 3. Assess the nutrition status of various stages of life cycle 4. Implement interventions to enhance nutritional status 5. Develop health policies and strategies that will help in nation development

Prerequisites: FNB1303 NUTRITION IN LIFE CYCLE

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	3	2	2	2	2	2	1
CO-2	2	1	1	3	3	3	1

CO-3	**1**	**1**	**2**	**3**	**2**	**2**	**2**
CO-4	**3**	**3**	**2**	**1**	**2**	**1**	**1**
CO-5	**3**	**2**	**2**	**1**	**1**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

Practicals	**(4L+5P)**
1. Nutrition education to preschool children in a preschool centre 2. Nutrition education to adolescent children in a school 3. Nutrition education to the pregnant woman 4. Food adulteration 5. Food fortification 6. Anaemia prevention programme 7. Nutrition awareness to all age groups by setting up an exhibition 8. Measures to overcome malnutrition, - Nutrikitchens, Hydrophonics, visit to Noon meal centres,cultivation of mushrooms	**CO-1BTL-2** **CO-2BTL-2** **CO-3BTL-2** **CO-4BTL-2** **CO-5BTL-2** **CO-1BTL-3** **CO-1BTL-3** **CO-1BTL-4**

TEXT BOOK	
1.	Suryapadas (2018) Textbook of community nutrition. Academic publishers.
REFERENCE BOOK	
1	Srilakshmi B (2020) Nutrition Science. New age publishers.

COURSE TITLE	RESEARCH METHODOLOGY			CREDITS	3
COURSE CODE	FNB1603	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course provides an introduction to the basis and principles of research methodology. Various research designs will be introduced that include experimental and non-experimental as well as qualitative and quantitative designs. The course also aims at stressing the importance and needs for research in food science.
Course Objective	1. To make understand some basic concepts of research and its methodologies 2. To learn about hypothesis framing 3. To allow students identify appropriate research topics select and define appropriate research problem and parameters 4. To provide knowledge to prepare a project proposal 5. To provide knowledge to organize and conduct research (advanced project) in a more appropriate manner
Course Outcome	Upon successful completion of the course students shall be able to: 1. Gain knowledge about the various type of research design that can be applied for research work 2. Acquire skills for hypothesis formulation 3. Design tools for collection, identification and interpretation of data with the use of tables and pictorial representations. 4. Develop proficiency to write research papers, reviews, casestudies. 5. Enable to become a qualified researcher

Prerequisites: FNB 1631 RESEARCH METHODOLOGY

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PSO-1	PSO-2	PSO-3
CO-1	3	2	2	2	1	2	2	1
CO-2	2	2	3	3	1	3	3	1

CO-3	**1**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
CO-4	**2**	**2**	**2**	**1**	**1**	**2**	**1**	**1**
CO-5	**3**	**3**	**1**	**1**	**2**	**1**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION TO RESEARCH (7L-2T)	
Meaning of research; Types of research- Exploratory research, Conclusive research; The process of research; Research applications in social and business sciences; Features of a Good research study	**CO-1 BTL-2**
MODULE 2: RESEARCH PROBLEM AND FORMULATION OF RESEARCH HYPOTHESIS (7L-2T)	
Defining the Research problem; Management Decision Problem vs Management Research Problem; Problem identification process; Components of the research problem; Formulating the research hypothesis- Types of Research hypothesis; Writing a research proposal- Contents of a research proposal and types of research proposals	**CO-2 BTL-2**
MODULE 3: RESEARCH DESIGN	**(7L-2T)**
Meaning of Research Designs; Nature and Classification of Research Designs; Exploratory Research Designs: Secondary Resource analysis, Case study Method, Expert opinion survey, Focus group discussions; Descriptive Research Designs: Cross-sectional studies and Longitudinal studies; Experimental Designs, Errors affecting Research Design	**CO-3 BTL-2**
MODULE 4: RESEARCH REPORTING (7L-2T)	
Types of research reports – Brief reports and Detailed reports; Report writing: Structure of the research report- Preliminary section, Main report, Interpretations of Results and Suggested Recommendations; Report writing: Formulation rules for writing the report: Guidelines for presenting tabular data, Guidelines for visual Representations	**CO-4 BTL-2**
MODULE 5: ETHICS IN RESEARCH	**(7L-2T)**
Meaning of Research Ethics; Clients Ethical code; Researchers Ethical code; Ethical Codes related to respondents; Responsibility of ethics in research	**CO-5 BTL-2**

TEXT BOOKS

1.	Suganda devi (2018). Research methodology. Handbook for beginners.New age publishers.
1	PaneerSelvam (2019) Research methodology. Prentice hall publications.

COURSE TITLE	FOOD SERVICE MANAGEMENT			CREDITS	3
COURSE CODE	FNC1711	COURSE CATEGORY	DE	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	0BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course presents the common food waste sources and respective high added-value components, while it describes the common recovery stages, conventional and emerging technologies applied from the source to the final product. It emphasize the advantages and disadvantages of Agro-food processing technologies and techniques, as well as to provide a holistic approach for the recovery of valuable components from food wastes
Course Objective	1. To comprehend and apply theory and principles of management in achievement of objectives. 2. To enable students to establish a food service unit 3. To help manage human resources and solve problems with remedial measures. 4. To provide knowledge in implementing quality control in food service institution. 5. To promote the product in the market
Course Outcome	Upon completion of this course, the students will be able to 1. To comprehend and apply theory and principles of management in achievement of objectives. 2. To enable students to establish a food service unit 3. To help manage human resources and solve problems with remedial measures. 4. To provide knowledge in implementing quality control in food service institution. 5. To promote the product in the market

Prerequisites: FNB1403 Food Commodities

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	3	3	2	2	2	1
CO-2	1	2	2	3	3	3	1
CO-3	2	2	3	3	2	2	2
CO-4	3	2	2	3	2	1	1
CO-5	3	3	2	1	1	1	2

1: Weakly related, 2: Moderately related and 3: Strongly related	
MODULE1: INTRODUCTION TO FOOD SERVICE OUTLETS (9L+0T)	
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. Different food and beverage service outlet.	**CO-1 BTL-2**
MODULE 2: EQUIPMENTS IN FOOD SERVICE (9L+0T)	
Equipments in food service: Classification of equipments, factors for selection of equipments, Service equipments, Care and use of equipment. Kitchen layout- Types of kitchen, location and layout.	**CO-2 BTL-2**
MODULE 3: MENU PLANNING (9L+0T)	
Menu planning: Sequence of course, Technique of writing menus, Functions of menu, Types of menu – Ala carte, Table d hotel and combination menu, novelle cuisine, Different types of cuisines, Types of service, Styles of service, Services available in restaurant	**CO-3 BTL-3**
MODULE 4: PERSONNEL MENAGEMENT (9L+0T)	
Staff organization of different outlets – manager, hostess, supervisor, steward, waiter. Uses of bills and checks on control system outlets	**CO-4 BTL-2**
MODULE 5: WORK FLOW (9L+0T)	
Flow of work, characteristics of a typical food service layout, layout of food plants-space allocation for the various areas and flow of traffic through receiving, storage, preparation, service and dish washing areas; arrangements of equipment in work centers; optimum working heights	**CO-5 BTL-2**
TEXT BOOK	
1.	June Payne Palacio (2019) Pearson Publication
REFERENCE BOOKS	
1	Mukerjee P (2018) Textbook of food beverage and management. Jaico publishing
E BOOK	
1.	http://www.foodwastenet.org/media/1132/fwn-workshop-16-17-july-2015-programme.pdf

COURSE TITLE	VALUE ADDITION TO FOOD INDUSTRY REFUSE			CREDITS	3
COURSE CODE	FNC1712	COURSE CATEGORY	PE	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course presents the common food waste sources and respective high added-value components, while it describes the common recovery stages, conventional and emerging technologies applied from the source to the final product. It emphasize the advantages and disadvantages of Agro-food processing technologies and techniques, as well as to provide a holistic approach for the recovery of valuable components from food wastes
Course Objective	1. To impart the knowledge regarding various types of waste generated from various food processing industries 2. To provide information on effective treatment and disposal management. 3. To provide knowledge on waste utilization and legislations 4. To become aware of the various value-added products 5. To provide sustainable food to the community by minimizing refuse
Course Outcome	Upon completion of this course, the students will be able to 1. Learn and understand about the classification of food industry refuse. 2. Know the methods of production of pectin, ethanol, citric acid, fibre extract from apple pomace. 3. Gain sufficient knowledge about production of lactose and whey from protein. 4. Utilize tea waste as feed for livestock and poultry. 5. Develop awareness about fermentation of food waste

Prerequisites: FNB 1301 Food Microbiology

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	3	3	2	2	2	2	1
CO-2	2	3	3	1	3	3	1
CO-3	3	3	3	3	2	2	2
CO-4	2	2	2	2	2	1	1
CO-	2	2	3	2	1	1	2

5							

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION	**(9L+0T)**
Types of food industries, classification of food industry refuse - handling, transportation and storage of industrial refuse – contamination of industrial refuse – effect of contamination and prevention methods – processing methods and processing equipments – their applications	**CO-1 BTL-2**
MODULE 2: FRUITS AND VEGETABLES (9L+0T)	
Production of pectin, ethanol, natural gas, citric acid, activated charcoal, fibre extract from apple pomace, vitamins - Production of citrus oil from peels of citrus fruits; Manufacture of candied peel and pectin from albedo of citrus fruits. Production of single cell protein by the use of potato wastes; Recovery of - Protein from potato starch plant waste	**CO-2 BTL-2**
MODULE 3: FISH MEAT POULTRY (9L+0T)	
Production of fish meal; Fish protein concentrate; Animal feed; Shell product; Glue from seafood processing waste. Texturised fish protein concentrate (marine beef); Utilization of organs and glands of animal as human food. Production of human food from animal blood and blood protein; Marketable products like chitin, chitosan, fertilizer, nutritional enhancer animal feed from shells	**CO-3 BTL-3**
MODULE 4: CEREALS (9L+0T)	
Feed for livestock from wheat and corn bran and germ. Extraction of oil & wax from rice bran, Puffed cereals from broken rice; Starch, modified starch and industrial alcohol from non-usable cereals; Silica from rice husk; Extraction of plolamin (Zein & katirin); Protein from sorghum; Beer spent graining.	**CO-4 BTL-2**
MODULE 5: DAIRY AND BEVERAGES (9L+0T)	
Fermentation products from whey. Condensed & dried products from whey; Production of lactose and protein from whey; Utilization of tea waste as feed for livestock & poultry	**CO-5 BTL-2**

TEXT BOOK	
1.	Garg(2019)Processing of food engineering .Jain brothers pubication.
REFERENCE BOOKS	
1	Sahay and Singh(2019)Vikas publishing house.
E BOOKS	
1.	http://download.poultryandmeatprocessing.com/v01/SciPoultryAndMeatProcessing%20-%20Barbut%20-%2018%20Byproducts%20and%20Waste%20-%20v01.pdf

COURSE TITLE	FOOD QUALITY TESTING AND EVALUATION			CREDITS	3
COURSE CODE	FNC1716	COURSE CATEGORY	DE	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course focuses on providing correct information about the composition and nutritive value of a food product that designed to protect the consumer from adulteration and falsification. It provides a well-organized quality control infrastructure and food regulations
Course Objective	1. To understand the need and importance of quality management in food production chain. 2. To understand intentional and non -intentional of food contaminants in the food chain. 3. To understand the chemical, technological and toxicological aspects of food additives 4. To learn about the various agencies that are involved in quality control 5. To become aware of the adverse effects of food toxication
Course Outcome	Upon completion of this course, the students will be able to 1. Learn and understand concept and importance of food appearance. 2. Know about the factors affecting taste quality, reaction time and factors affecting it. 3. Have sufficient knowledge of functions of colours used in foods 4. Acquire knowledge about the various good manufacturing procedures 5. Comprehend the importance of quality control procedures

Prerequisites: FNB 1204 Food Science

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	3	3	2	2	1
CO-2	2	2	2	1	3	3	1
CO-3	3	3	3	2	2	2	2
CO-4	3	2	2	3	2	1	1
CO-5	3	3	3	1	1	1	2

1: Weakly related, 2: Moderately related and 3: Strongly related	
MODULE 1: INTRODUCTION TO QUALITY ATTRIBUTES (9L+0)	
Appearance, flavour, textural factors and additional quality factors – Concept and Importance of Food Appearance, Sensory Assessment of Appearance- panel selection, screening and training; Physical requirement for food appearance, types of sensory test, Appearance Scales	**CO-1 BTL-2**
MODULE 2: TASTE (9L+0)	
Introduction, Organs involved in taste perception- tongue, papillae, taste buds, salivary glands mechanism of taste perception. Chemicals responsible for sweet, salt, sour, and bitter taste their structure and chemical dimensions. Factors affecting taste quality, reaction time and factors affecting it. Absolute and recognition threshold taste abnormalities	**CO-2 BTL-2**
MODULE 3: OLFACTION	**(9L+0)**
Introduction and definition, anatomy of nose, mechanism of odour perception. Prerequisites for odour perception, odour classification, chemical specificity of odour. measurement of odour using different techniques primitive, double tube olfactometer, Elseberg techniques, Wenzel's olfactometer, sniffing, merits and demerits of each methods, olfactory abnormalities	**CO-3 BTL-3**
MODULE 4: COLOUR	**(9L+0)**
Introduction to natural and synthetic colours. Functions of colour in foods. Optical aspect of colour, perception of colour, objective evaluation, colour measurement using different systems- Munsell colour system, CIE colour system, qualitative and quantitative analysis of colour, reflectance spectrophotometry and Colorimetry	**CO-4 BTL-2**
MODULE 5: TEXTURE	**(9L+0)**
Introduction, definition and classification of texture profile. Subjective evaluation, phases of oral processing. Objective analysis, rheological methods of texture measurement including rheological models. Measurement of texture in various food groups viz. cereals, dairy, fruits and vegetables, fish, meat and meat products.	**CO-5 BTL-2**
TEXT BOOKS	
1.	Shakuntala Manay and Shadaksharasamy. (2020) Food facts and Principles. New age publishers.
REFERENCE BOOKS	
1	Meilgard(2019). Sensory evaluation Techniques. CRC Press.
E BOOKS	
1.	http://everestpublishinghouse.com/pdf/Everest-Mngt.Price%20List%20(2014-15).pdf

COURSE TITLE	FOOD ADDITIVES			CREDITS	4
COURSE CODE	FNC 1717	COURSE CATEGORY	PC	L-T-P-S	3-1-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course will provide the importance of food additives in food acting as a compliment in order to improvise its quality presumption. The formula addition and the desired additive will be based on the food content and nutritive value. The course completely relates to the preservation and additive components pertaining to the food substance.
Course Objective	To enable the students 1. To elucidate the role of additives in food 2. To analyze the nutrient specializations in accordance with the food additive. 3. To discuss the correlation of food and its additive 4. To implement the formulation skills in industrial oriented mechanisms. 5. To inculcate the ideology in research oriented fashion.
Course Outcome	Upon completion of this course, the students will be able to 1. Understand about the main additive classification in varieties of food. 2. Gain knowledge about micronutrient analysis involved in food classifications. 3. Learn about the protein formation and their role with amino acid essentials 4. Detect the analytical energy based roles of macro and micro-nutrients in food 5. Develop study on the mechanism of action of the food metabolism of nutrients.

Prerequisites: FT1202 Principles of Food Science

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	-	-	2	-	-
CO-2	2	2	1	-	-	-	1
CO-3	1	-	2	-	2	2	2

CO-4	**1**	**3**	**-**	**1**	**3**	**1**	**-**
CO-5	**-**	**2**	**-**	**1**	**-**	**-**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1 – INTRODUCTION	**(9L+3T=12)**
Food additives- definitions, classification and functions, need for food additives, food preservatives, classifications, antimicrobial agents. safety concerns, regulatory issues in India, international legal issues Nutrient supplements & thickeners, polysaccharides, bulking agents, antifoaming agents, synergists, antagonists.	**CO-1** **BTL-2**
MODULE 2 – ANTIOXIDANTS	**(9L+3=12T)**
Antioxidants (synthetic and natural, mechanism of oxidation inhibition), chelating agents: types, uses and mode of action.	**CO-2** **BTL-2**
MODULE 3 – COLOURING AGENTS	**(9L+3T=12)**
Color retention agents, applications and levels of use, natural colorants, sources of natural color (plant, microbial, animal and insects), misbranded colors, color extraction techniques, color stabilization.	**CO-3** **BTL-3**
MODULE 4 – FLAVOURING AGENTS	**(9L+3T=12)**
Flavoring agents: flavors, flavor enhancers, flavor stabilization, flavor encapsulation Flour improvers: leavening agents, humectants and sequesterants, hydrocolloids, acidulants, pH control agents buffering salts, anticaking agents, etc.	**CO-4** **BTL-2**
MODULE 5 – SWEETNERS	**(9L+3T=12)**
Sweeteners: natural and artificial sweeteners, nutritive and non-nutritive sweeteners, properties and uses of saccharin, acesulfame-K, aspartame, corn sweeteners, invert sugar sucrose and sugar alcohols (polyols) as sweeteners in food products Emulsifiers: Types, selection of emulsifiers, emulsion stability, functions and mechanism of action. Additives, food uses and functions in formulations; permitted dosage	**CO-5** **BTL-2**

TEXT BOOK	
1.	Seyed Mohammed Nobavi. (2012). Food Additives and Human Health
REFERENCE BOOK	
1	Morton ID & Macleod AJ .(2014). Food Flavours. Part A, B & C. Elsevier.
MOOC	
1	https://efsa.onlinelibrary.wiley.com/doi/full/10.2903/j.efsa.2020.e181110

COURSE TITLE	ENTREPRENEURSHIP DEVELOPMENT			CREDITS	3
COURSE CODE	FNC 1715	COURSE CATEGORY	DE	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course will focus on opportunities and challenges for establishing new business ventures, benefits/ drawbacks of entrepreneurship, strategic management and forms of business ownership, marketing strategies, venture finance and human resource management
Course Objective	1. To develop idea generation, creative and innovative skills 2. To provide awareness of different opportunities and successful growth stories 3. To impart skills to design business plans suitable for funding by considering all dimensions of business. 4. To provide different case studies and find exceptions to the process model of entrepreneurship. 5. To provide the experience of science and art of doing business.
Course Outcome	Upon completion of this course, the students will be able to 1. Learn and understand nature, scope and importance of entrepreneurship. 2. Gain knowledge on different types of entrepreneurships 3. Know the methods of various trade license and registration marks. 4. Become aware of small scale, large scale, manufacturing and service industries 5. Develop sufficient knowledge about the various procedures, techno-economic feasibility for starting fruits and vegetable processing, bakery and confectionary, mushroom manufacture and soybean processing units

Prerequisites: FNB 1204 Food Science

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	1	2	1	3	2	2	1
CO-2	3	1	1	2	3	3	1
CO-3	3	3	2	1	2	2	2

CO-4	**3**	**3**	**2**	**1**	**2**	**1**	**1**
CO-5	**2**	**2**	**1**	**1**	**1**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION	**(7L-2T)**
Entrepreneur & entrepreneurial flair; Classification of small, medium and large-scale manufacturing industries; Opportunities of food processing industries in West Bengal.	**CO-1 BTL-2**
MODULE 2: SCOPE OF ENTREPRENEURSHIP	**(7L-2T)**
Nature, scope and importance of entrepreneurship; business ideas, source of business ideas, feasibility studies, problem solving and decision making. Agricultural sector and food processing industry problems and opportunities; self-employment need and entrepreneurship in foods sector, project sizing, fund management and enterprise management issues in food entrepreneurship, entrepreneurship development policies of government in food business	**CO-2 BTL-2**
MODULE 3: PROCEDURE TO START A BUSSINESS (7L-2T)	
Trade license and registration marks; Sources of finance; Selection of land and factory sheds.	**CO-3 BTL-2**
MODULE 4: EQUIPMENT MANAGEMENT (7L - 2T)	
Agencies for promotion of food processing industries; Source of machine and equipment	**CO-4 BTL-2**
MODULE 5: WRITING PROJECT PROPOSAL (7L -2T)	
Preparation of project report; Market feasibility reports; Techno-economic feasibility report on fruits and vegetable processing, bakery and confectionary, mushroom manufacture and soybean processing.	**CO-5 BTL-2**

TEXT BOOKS	
1.	Poornima Charantimath (2020). Entrepreneurship development and small enterprises, Pearson Publications.
REFERENCE BOOKS	
1	Anil Kumar (20190. Entrepreneurship development, New Age Publishers.
E BOOKS	
1.	http://everestpublishinghouse.com/pdf/Everest-Mngt.Price%20List%20(2014-15).pdf

COURSE TITLE	FERMENTED FOODS			CREDITS	3
COURSE CODE	FNC 1713	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course deals about the history of fermented foods and beverages and the impact of fermentation on flavour, aroma, and taste and from chemistry to microbiology of fermented foods, the role of different types of microbes in production, preservation, and enhancement of diverse foods.
Course Objective	1. To understand various principles and procedures involved in fermentation of foods 2. To examine the different biochemical and microbial systems involved in various food and beverage fermentations 3. To study common biochemical pathways involved in different fermentation systems 4. To discuss on the methods for starter culture preparation, protection and use. 5. To learn about the impact of fermentation on nutritive value, flavour,aroma
Course Outcome	Upon completion of this course, the students will be able to 1. Identify the principles of food fermentation technology 2. Evaluate the types of starters used in Food Industry 3. Discuss about the production of various fermented foods, alcoholic and non-alcoholic beverages. 4. Apply the benefits of traditional foods and its existence at present to explore 5. Compile the Impact of fermented products and its benefits

Prerequisites: FT1301 Food microbiology

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3

CO-1	**2**	**2**	**-**	**2**	**2**	**2**	**1**
CO-2	**2**	**1**	**1**	**3**	**3**	**3**	**1**
CO-3	**1**	**-**	**2**	**-**	**2**	**2**	**-**
CO-4	**2**	**3**	**-**	**1**	**2**	**1**	**2**
CO-5	**2**	**2**	**-**	**1**	**-**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1 – IMPORTANCE OF FERMENTED FOODS	**(9L)**
Fermentation - Principles, Types of fermentation, Types of fermented foods, Advantages of fermentation. Organisms used for production of fermented food products; Environmental parameters for fermentation process; safety criteria of fermented foods.	**CO-1** **BTL-2**
MODULE 2 – BENEFICIAL ASPECTS OF FERMENTATION	**(9L)**
Microorganism involved in Fermentation, Microbial activities with specific role in Fermentation, Significance of Fermentation food in Indian diet, Factors influence growth & Metabolic activities of microbes in food Fermentation.	**CO-2** **BTL-2**
MODULE 3 – CEREAL BASED FERMENTED PRODUCTS	**(9L)**
Cereal and legume based fermented products like Bread, Soya Sauce, Koji, Tempeh, Miso, Natto, Tofu, Angkkak; Indian products like Idly, Dosa, Vada, Bori. Alcoholic beverages and vinegar.	**CO-3** **BTL-3**
MODULE 4 –VEGETABLES, FISH AND MEAT BASED FERMENTED PRODUCTS	**(9L)**
Different types of pickles like olive cucumber, salt stock and dill pickles, Fish sauce, sausages and Surimi.	**CO-4** **BTL-2**
MODULE 5 – DAIRY BASED FERMENTED PRODUCTS	**(9L)**
Cheese, Butter, Yoghurt, Kefir, Koumiss, Srikhand, Cultured butter milk; Whey based fermented products	**CO-5** **BTL-2**

TEXT BOOK

1.	Joshi VK (2014). Indigenous fermented foods. CRC press I edition

REFERENCE BOOK

1	Sankarnarayan A(2013)Fermented food products. CRC press I edition

E BOOK

1	https://www.itseyeris.com/book/100-of-the-top-fermented-foods
MOOC	
1	WWW.udemy.com/fermented foods/online courses

COURSE TITLE	FOOD SAFETY			CREDITS	3
COURSE CODE	FNC 1714	COURSE CATEGORY	PE	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course deals with the Introduction to concepts of food quality, food safety, food quality assurance and food quality management; objectives, importance and functions of quality control, Current challenges to food safety.
Course Objective	To enable the students 1 To enter a career in the food industry as food safety scientists ensuring the production and marketing of foods. 2 To Provide a broadly based scientific education whose graduates can also enter into employment in other sectors of the food chain 3 To develop capacity to undertake research into the science of foods. 4 To provide undergraduates with opportunities to develop their inter-personal and communication skills.
Course Outcome	Upon completion of this course, the students will be able to 1. Have Knowledge on food quality and food safety. 2. Examine on Desirable safety features of some food processing equipment. 3. Elucidate the Role of maintenance staff and plant operators 4. Have Knowledge on AGMARK 5. Have Knowledge on BIS

Prerequisites: FNB1703 FOOD SAFETY

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3

CO-1	**2**	**1**	**1**	**2**	**1**	**1**	**2**
CO-2	**1**	**2**	**2**	**2**	**2**	**1**	**2**
CO-3	**2**	**2**	**1**	**1**	**1**	**2**	**1**
CO-4	**2**	**2**	**1**	**1**	**1**	**2**	**1**
CO-5	**2**	**1**	**-**	**2**	**-**	**2**	**1**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1 – INTRODUCTION TO FOOD SAFETY	**(9L)**
Introduction to concepts of food quality, food safety, food quality assurance and food quality management; objectives, importance and functions of quality control, Current challenges to food safety.	**CO-1** **BTL-2**
MODULE 2 – SAFETY ACT	**(9L)**
Role of national and international regulatory agencies, Bureau of Indian Standards (BIS), AGMARK, Food Safety and Standards Authority of India (FSSAI), Introduction to WTO agreements: SPS and TBT agreements, Codex alimentarious commission, USFDA, International organization for standards (ISO) and its standards for food quality and safety (ISO 9000 series, ISO 22000, ISO 15161, ISO 14000)	**CO-2** **BTL-2**
MODULE 3 – SAFETY DURING PROCESSING	**(9L)**
HACCP; Desirable safety features of some food processing equipment; Personal protective equipment; Safety from adulteration of food.	**CO-3** **BTL-3**
MODULE 4 – PLANT MAINTENANCE	**(9L)**
Role of maintenance staff and plant operators; Preventive maintenance; Guidelines for good maintenance & safety precautions; Lubrication & lubricants; Work place improvement through '5S'.	**CO-4** **BTL-2**
MODULE 5 – PERONAL HYGENE	**(9L)**
Hygiene and sanitation requirement in food processing and fermentation industries; Cleaning, sanitizing & pest control in food processing; storage and service areas	**CO-5** **BTL-2**

TEXT BOOK

1. Yasmine Motarjemi. (2012) Food Safety Management, A Practical Guide for the Food Industry. Academic Press.

REFERENCE BOOK

1	S J Forsythe, P R Hayes. (2016) Food Hygiene, Microbiology & HACCP. Springer.

COURSE TITLE	FOOD ADULTERATION AND FOOD TOXICOLOGY			CREDITS	3
COURSE CODE	FNC 1718	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	Food adulteration and toxicology is concerned with assessing the adulteration and injurious effects on living systems of chemicals present in foods. The chemical agents can be man-made (e.g., pesticide residues, food additives, contaminants originating with processing machinery, or packaging materials) or of natural origin (e.g., microbial, animal or plant toxins).
Course Objective	To enable the students 1. To understand interaction between constituents and its effects on food quality 2. To illustrate the importance of food safety, food quality, food laws and regulations in Food industry. 3. To describe the food quality management systems. 4. To explain the nationals and international food laws and regulations. 5. To exemplify different food adulterants.
Course Outcome	Upon completion of this course, the students will be able to 1. Asses nutritional quality of food and composition 2. Evaluate sensory quality test with instruments 3. Setup quality management system in food industry 4. Inspect from raw material to final product in processing line 5. Analyze undesirable constituents in food during processing

Prerequisites: FT1403 Food Waste Management

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	1	2	2	2	2	2	1
CO-2	0	1	1	1	2	-	1

CO-3	**1**	**1**	**1**	**-**	**2**	**2**	**2**
CO-4	**0**	**2**	**2**	**1**	**2**	**1**	**1**
CO-5	**2**	**2**	**-**	**1**	**-**	**1**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1 – ADULTERATION	**(9L)**
Introduction to common adulterants and their detection techniques in salts, fats, oil, milk and milk products, spices and condiments, tests for some specific adulterants impact of adulteration and new adulterant.	**CO-1** **BTL-2**
MODULE 2 – : INTRODUCTION TO FOOD TOXICOLOGY	**(9L)**
Classification, dose, determinants of toxins in foods; naturally occurring toxins from animals, bacterial and fungal and sea food sources. Risk assessment in food toxicology; laws and regulation of safety assessment of foods including food additives, environmental contaminants, pesticides and antibiotic residues.	**CO-2** **BTL-2**
MODULE 3 – TOXIC MATERIALS	**(9L)**
Allergens, toxic constituents and anti-nutritional factors of plant foods (enzyme inhibitors, trypsin and chymotrypsin inhibitor, amylase inhibitor, flatulence causing sugars, phytolectins).	**CO-3** **BTL-3**
MODULE 4 –AGRICULTURAL AND INDUSTRIAL CONTAMINANTS	**(9L)**
Pesticides residues in fruits and vegetables, metal contaminants in foods and their toxicity in human body; animal drug residues in food and water, dioxins and related compounds in food; metals such as lead, arsenic and mercury.	**CO-4** **BTL-2**
MODULE 5 – FOOD ADDITIVES AS TOXICANTS	**(9L)**
Artificial colors, preservatives, sweeteners; toxicants formed during food processing such as nitrosamines, maillard reaction products acrylamide, benzene, heterocyclic amines and aromatic hydrocarbons and irradiation; risk of genetically modified food, food supplements, persistent organic pollutants, toxicity implications of nanotechnology in food	**CO-5** **BTL-2**

TEXT BOOK

1.	Shibamato T. and Bjeldanes L. (2014) Introduction to Food Toxicology, Academic Press, Inc. San Diego, CA

REFERENCE BOOK

1	Tõnu Püssa (2014). Principles of Food Toxicology, Second Edition, CRC Press.

COURSE TITLE	COVENIENCE FOODS			CREDITS	3
COURSE CODE	FNC 1719	COURSE CATEGORY	PC	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	The course deals with Convenience foods which are defined as types of foods that save time in food acquisition, preparation, and cleanup. Convenience foods are ready-to-eat food from grocery stores. The ready-to-eat food encompasses many types of food ranging from bananas to frozen pizza that require little or no preparation.
Course Objective	1. learn about the convenience food market 2. gain knowledge about convenience food and snack food 3. familiarize with the toxicological hazards and safety regulation 4. Understand the difference between convenience food, instant food, fast-food, ready-made foods
Course Outcome	Upon completion of this course, the students will be able to 6. Understand the growth and trends of convenience foods 7. Acquire knowledge about processing of different types of convenience food 8. Understand the different euipments used in the snack food industry 9. Percieve the microbial safety of convenience foods 10. Gain knowledge on the microbial and toxicological aspects of convenience foods

Prerequisites: FNB 1302 – Food science

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	2	1	2	2
CO-2	3	2	2	2	2	2	2
CO-3	3	3	3	1	3	1	2

CO-4	**2**	**3**	**1**	**1**	**1**	**1**	**2**
CO-5	**2**	**1**	**3**	**2**	**3**	**2**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: MARKET TRENDS OF CONVENIENCE FOODS **(9L+3 T)**	
History, Definition, need for convenience and snack foods, classification of convenience foods, types of snack food having higher market value, consumption pattern of processed foods, pros and cons of convenience food industry, growth trends, retail market prospects ofIndian convenience foods.	**CO-1** **BTL-2**
MODULE 2: CONVENIENCE AND SNACK FOODS **(9 L+ 3 T)**	
Technology for breakfast cereals(RTE) – maize, rice, sorghum,ragi and legume based – roasted, toasted, puffed, popped, flaked; types and manufacturing of ready-to cook foods(RTC) Snack Bars, grains & nuts – salted, spiced, sweetened, Batter-Based and Dough-Based Products, Fruit and vegetable based Snacks - Potato Chips and French Fries, Papad andNamkin, Banana Chips, fruit bars other ready to eat beverages	**CO-2** **BTL-2**
MODULE 3: EQUIPMENT USED IN CONVENIENCE FOOD PRODUCTS **(9L+ 3 T)**	
Equipment used in manufacturing of RTC and RTE, Heat transfer mechanism, specialised equipment for frying, Baking-Ovens, Electronic Ovens, Driers, Toasting ovens, SpecializedEquipment for Popcorn processing, Poppers, Sifters, Coaters, other equipment like Peelers,Slicers, dicers, graders etc	**CO-3** **BTL-3**
MODULE 4: EXTRUDED PRODUCTS AND IT'S TECHNOLOGY **(9 L+ 3 T)**	
Extrusion: definition, principles, and types. Introduction to extruder uses of extruders in the food industry, Classification of the extruder, components and functions of an extruder; Noodle production, Cereal based pasta production and tortilla manufacture, Use of extruders in the snack processing industry.	**CO-4** **BTL-2**
MODULE 5: MICROBIAL AND TOXICOLOGICAL SAFETY **(9 L+ 3 T)**	
Food – borne pathogens in convenience foods and its Microbial safety. Toxicological hazards- Acrylamide in ready to eat foods, furan in processed foods, biogenicamines and disinfection by products, Safety regulations.	**CO-5** **BTL-2**
TEXT BOOK	
1.	Dr. Himadri Panda, The complete technology of snack foods. NIIR Project consultancy services.2019
REFERENCE BOOK	

1	Edmund WL Snack Foods Processing, AVI Publishers. 2018
E BOOKS	
1.	https://shodhganga.inflibnet.ac.in/bitstream/10603/101927/11/11_chapter%203.pdf

COURSE TITLE	INTRODUCTION TO FOOD SERVICES			CREDITS	3
COURSE CODE	FNC 1720	COURSE CATEGORY	PE	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	ACM 7/08/2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course deals with the types of food service establishmentfoodservicenning, and planning procedures ,types of menus and typesof services in a food service operation
Course Objective	To enable the students 1. To enter a career in the catering industry as catering scientists capable of ensuring the production of safe and quality foods. 2.Provide a broadly based scientific education whose graduates can also enter into employment in other sectors of the food chain or related scientific sectors where they can apply their scientific skills. 3.To allow individuals to develop their capacity to undertake rese arch into the science of foods. 4.To provide undergraduates with opportunities to develop their inter-personal and communication skills. 5. To create a knowledge based skill towards research oriented aspiration.
Course Outcome	Upon completion of this course, the students will be able to 1. Have Knowledge on food quality and food safety. 2. Examine on preparation of fast foods. 3. Elucidate the Role of maintenance staff and plant operators 4. Have Knowledge on Various types of catering establishments 5. Have Knowledge on Various cleaning procedures in a hotel.

Prerequisites: FNC 1704 FAST FOODS AND CATERING SERVICES

CO, PO AND PSO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PSO-1	PSO-2	PSO-3
CO-1	2	1	1	2	1	1	2
CO-2	1	-	-	-	2	-	2

CO-3	**2**	**2**	**1**	**1**	**-**	**2**	**-**
CO-4	**2**	**2**	**1**	**1**	**1**	**2**	**-**
CO-5	**1**	**1**	**-**	**2**	**-**	**1**	**1**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1 – Introduction to hospitality industry (9L+0T=9)	
Characteristics, Commercial hotels, restaurants, transport catering, Non commercial and out door food services	**CO-1** **BTL-2**
MODULE 2 – Menu planning (9L+0T=9)	
Definition of the menu, Types of menu, Planning procedure, standardization of recipe, characterstics of a menu, factors to be considered while planning menu	**CO-2** **BTL-2**
MODULE 3 – (9L+0T=9)	
Production and service -Different types of production , delivery system, Styles of service	**CO-3** **BTL-3**
MODULE 4 – Equipmets (9L+0T=9)	
Classification, selection of equipment, Functional classification of equipments used in food service	**CO-4** **BTL-2**
MODULE 5 – Environmental management (9L+0T=9)	
Green Design , Energy Conservation , Water Conservation, Source Reduction ,Recycling Incineration and Landfilling • Facility Waste Assessments	**CO-5** **BTL-2**

TEXT BOOK

1.	June Payne Palacio, Monica theis .(2019) Introduction to food service.11 th edition

REFERENCE BOOK

1	Mohini Sethi (2019) Institutional food management .New age publishers.

E BOOK

1.	https://watchrovibe.files.wordpress.com/2015/07/hotel-housekeeping-training-manual-sudhir-andrews-pdf.pdf