विज्ञान संकाय
लखनऊ विश्वविद्यालय लखनऊ

दिनांकः– 15.02.2021

एम0एससी0 न्यूट्रिशन के अध्ययन मण्डल की आकस्मिक बैठक दिनांक 15.02.2021 की कार्यवृत्त।

एम0एससी0 न्यूट्रिशन के अध्ययन मण्डल की आकस्मिक बैठक दिनांक 15.02.2021 को अपराहन 02:15 बजे अधिष्ठाता कार्यालय विज्ञान संकाय के विस्तार कक्ष में आहूत की गयी, जिसमे निम्नलिखित सदस्य कार्यालय में उपस्थित हुएः–

1. संकायाध्यक्ष, विज्ञान संकाय, ल0वि0वि0 (अध्यक्ष)।
2. विभागाध्यक्ष, जैव–रसायन विभाग, ल0वि0वि0।
3. विभागाध्यक्ष, सांख्यिकी विज्ञान विभाग, ल0वि0वि0।
4. विभागाध्यक्ष, वनस्पति विज्ञान विभाग, ल0वि0वि0।
5. विभागाध्यक्ष, जन्तु विज्ञान विभाग, ल0वि0वि0।
6. विभागाध्यक्ष, शिक्षा शास्त्र विभाग, ल0वि0वि0।
7. डा0 नीलम कुमारी, आई0टी0 पी0 जी0 कालेज, लखनऊ।
8. डा0 रुकसा मिश्रा, आई0टी0 पी0 जी0 कालेज, लखनऊ।

बैठक में निम्नलिखित निर्णय परिणित हुएः

1. सर्वप्रथम संकायाध्यक्ष महोदय ने सभी उपस्थित सदस्यों का स्वागत किया।
2. राष्ट्रीय शिक्षा नीति 2020 के अनुसार एम0एससी0 न्यूट्रिशन के रिवाइज्ड सिलेबस पर विचार किया गया एवं सर्वसम्मति से अनुमोदन कर विज्ञान संकाय परिषद हेतु अग्रसारित किया गया।
3. धन्यवाद ज्ञापन के साथ बैठक सम्पन्न हुई।

T. Tiwari
संकायाध्यक्ष,
विज्ञान संकाय,
ल0वि0वि0।

15.2.21

15/2/21

Geetha Thomas

ISABELLA THOBURN COLLEGE,
University of Lucknow
Master of Science (Nutrition)
Programme

ISABELLA THOBURN COLLEGE, LUCKNOW

University of Lucknow

Master of Science (Nutrition) Programme

Regulations 2020

1. Applicability

These regulations shall apply to the Master of Science (Nutrition) programme from the session 2020-21.

2. Minimum Eligibility for admission

A three/four-year Graduate Degree in B.Sc. (H.Sc.) with Nutrition/Clinical Nutrition & Dietetics or B.Sc. (Biology) with Clinical Nutrition & Dietetics awarded by a University or Institute established as per law and recognised as equivalent by this University with minimum 50% marks in aggregate in graduation or equivalent grade, shall constitute the minimum requirement for admission to the Master of Science (Nutrition) programme.

3. Programme Objectives

The program is designed to help students

- To impart knowledge and training in Nutrition discipline so as to empower young women to work as Nutrition Professionals.
- To impart the understanding of the concepts of biochemistry, food science and food microbiology
- To enable the students to learn the methods of assessing human nutritional requirements, nutritional assessment and diet planning
- To apply theoretical concepts in laboratory setting as per standard methods in the above mentioned areas
- To acquire skills to undertake systematic research in the area of food science and nutrition.

4. Programme Outcomes

- On completing M.Sc. with Nutrition, students will understand the role of food and nutrients in health and disease processes and they will be able to prepare and deliver effective presentations on technical information on food science and nutrition at professional level as well as to the general public.

- Students will also be able to provide nutrition counselling and education individuals, groups, and communities through their clear concept and knowledge by applying technical and decision making skills by assessing and evaluating the nutritional status of individuals and communities.
- They can make their outstanding career in hospitals and clinics as dietitian or nutritionist or can opt to go for food industries and entrepreneurship.

5. Specific Programme Outcomes

The courses included will empower the students to work as nutritionists, dietitian, researchers ,faculty in colleges and universities, entrepreneurs etc.

 Understand the concepts of biochemistry, food science and food microbiology

 Comprehend methods of assessing human nutritional requirements, nutritional assessment and diet planning

 Apply theoretical concepts in laboratory setting as per standard methods in the above mentioned areas

 Understand the applications of nutritional sciences in clinical interventions, communication for health promotion, food service management, food scienee and processing

 Acquire skills to undertake systematic research in the area of food science and nutrition. The courses will enable the students to manage diet during various communicable and non-communicable diseases for faster recovery.

The courses designed will develop competency to plan and prepare designer foods as per the requirement of group/community and to take it as entrepreneur and contribute to national development by inproving the productivity of its human resource through achieving optimal nutritional status and good health.

6. Course Structure

The course structure of the Master of Science (Nutrition) programme shall be as under:

Course No.	Name of the Course	Credit	Remark
	SEMESTER I		
NUTCC-101	Paper -1 HUMAN PHYSIOLOGY	04	Core Course
NUTCC-102	Paper -2 FOOD MICROBIOLOGY	04	Core Course
NUTCC-103	Paper-3 INSTITUTIONAL FOOD ADMINISTRATION	04	Core Course
NUTCC-104	Paper -4 FOOD SCIENCE AND EXPERIMENTAL COOKERY	04	Core Course
NUTCC-105	Paper -5 PRACTICAL	04	Core Course
NUTVC-101	Paper -6 FOOD PRESERVATION	04	Value added course (Credited)
	Semester Total	24	
	SEMESTER II		
NUTCC-201	Paper-7 NUTRITIONAL BIOCHEMISTRY	04	Core Course
NUTCC-202	Paper -8 RESEARCH METHODS AND STATISTICS	04	Core Course
NUTCC-203	Paper -9 ADVANCED NUTRITION	04	Core Course
NUTCC-204	Paper -10 COMMUNITY NUTRITION	04	Core Course
NUTCC-205	Paper -11 MATERNAL AND CHILD NUTRITION	04	Core Course
NUTCC-206	Paper -12 PRACTICAL	04	Core Course
NUTVNC-201	Paper -13 BAKERY SCIENCE	00	Value added course (Non Credited)
	Semester Total	24	
	SEMESTER III		
NUTCC-301	Paper -14 DIET THERAPY	04	Core Course
NUTCC-302	Paper -15 PRACTICAL	04	Core Course

NUTEL-301A/B	Paper -16 NUTRITIONAL EPIDEMIOLOGY/ FUNCTIONAL FOODS	04	Elective
NUTEL-302A/B	Paper -17 FOOD SAFETY AND QUALITY CONTROL/ SENSORY EVALUATION OF FOOD	04	Elective
NUTIN-301	Paper -18 INTERNSHIP REPORT, VIVA VOCE	04	Summer Internship
NUTIER-301	Paper -19 FOOD TOXICOLOGY/MOOC	04	Interdepartmental Course
	Semester Total	24	
	SEMESTER IV		
NUTCC-401	Paper -20 FOOD PRODUCT DEVELOPMENT	04	Core Course
NUTEL-401A/B	Paper -21 NUTRITION IN EMERGENCY AND DISASTER/ GERIATRIC NUTRITION	04	Elective
NUTEL-402A/B	Paper -22 NUTRITION IN HEALTH AND FITNESS / NUTRITION AND HEALTH OF WOMEN	04	Elective
NUTMT-401	Paper -23 DISSERTATION	08	Master Thesis
NUTIRA-401	Paper -24 RESEARCH TECHNIQUES AND INSTRUMENTATION	04	Intradepartmental Course
	Semester Total	24	
	GRAND TOTAL	96	

NUT – Subject; NUTCC – Core Course; NUTVC – Value added course (Credited);

NUTVNC - Value added course (Non-Credited); NUTEL –Elective;

NUTIER – Interdepartmental Course; NUTIRA – Intradepartmental Course

7. Course Outlines

(kindly provide Course outcomes, Course outlines split into five units and References separately for each course)

Course Code
NUTCC101

SEMESTER 1
PAPER 1
HUMAN PHYSIOLOGY

COURSE OUTCOMES:

- On completion of this course, students will be able to understand the physiological processes and functions as applicable to human nutrition.
- Able to distinguish different organs and their functional anatomy in each system, their specific disease, and
- Understand how nutrition plays its part in curing that condition.

UNIT – 1

1) Blood: Blood composition, plasma proteins-origin composition and function, blood groups, red blood cells- structure and functions.
2) Circulatory system: working of the heart, anatomy, heartbeat, heart sound, velocity of blood flow, arteries, capillaries, veins. Physiology constancy of blood pressure, cardiac cycle.

UNIT -2

3) Digestive system: Organs, digestion, absorption and metabolism of carbohydrates, fats, proteins, minerals, water.
4) Respiratory system: organs, structure, function, artificial respiration.

UNIT – 3

5) Muscular system: Types of muscles-striated and non-striated, their structure and functions. Mechanism of muscle contraction, sliding, filament model, it's physical and molecular description. Study of muscle fiber, microscopic structure and molecular structure. Muscle fatigue.

6) Excretory system: urinary system, organs, structure, function, skin-it's structure and functions. Maintenance of acid- base balance, temperature of body and it's regulation

UNIT – 4

7) Endocrine System: Glands and their hormones, function and regulation.
8) Reproductive system: Organs of male reproductive system and female reproductive system their structure and function. Fertilization, implantation, pregnancy, parturition, lactation, ovarian and uterine cycle, effect of hormones on menstruation.

UNIT – 5

9) Nervous system :Central nervous system –structure and functions, peripheral system – structure and function ,structure of neuron, nerve impulse transmission, structure and

function of synapse, autonomic nervous system-function and importance, neuro transmitters – types and functions.

10) Sense receptors: Types, their structures and functions, study of eyes, ear, tongue, nose and skin as sense organs.

Practical:

1) Examination of slides of connective tissues, nerve tissue, muscular tissue, epithelial tissue.
2) Recording of number and type of respiration.
3) Digestive system :
   a) Saliva test for mucin.
   b) Digestion of starch paste.
   c) Estimation of amylase in saliva.
   d) Estimation of haemoglobin.
   e) Blood film preparation, staining, blood grouping and matching.
   f) Heart sound, blood pressure, pulse.
   Clinical examination and recording

References:-

1. Kale, C.A. and Nail, E Samson Wright's Applied Physiology, Oxford University press, 1994.

2. Griffins, M. Introduction to Human Physiology, Mac Millan and Co. 1974.

3. Green, J.H. An introduction to human physiology, Oxfords University Press 1972.

4. Best C.H. and Taylor N.B., The living body, Asia publishing House, 1975.

5. Guyton. A.C. Hall, J.E. : Text GBook of Medical Physiology – 9th Ed/ Prism Books (Pvt.) Ltd. Bangalore.

6. Wilson : Anatomy and Physiology in Health and Illness

Course Code
NUTCC102

PAPER 2

FOOD MICROBIOLOGY

Course Outcomes:

- On completion of this course, students will be able to understand the important pathogens and spoilage microorganisms in foods,
- The most likely sources of these organisms, and the conditions under which they grow,
- The role of beneficial microorganisms in foods and their use in fermentation processes.
- Students able to use appropriate laboratory techniques to enumerate, isolate, and identify microorganisms in foods.
- Understand the basic principles of food preservation methods, including low temperature, heating, using chemicals and food irradiation

UNIT – I

1. Scope of food microbiology.
2. Morphology, classification and identification of microorganisms.

UNIT –II

3. Growth and nutrition of microorganisms.
4. Distribution of micro-organisms:
   a) Water- sources, contamination, purification, diseases by contaminated water.
   b) Food contamination: sources & prevention.

UNIT-III

5. Food spoilage: Effect of spoilage on different products.
6. Methods of detection and isolation of micro-organisms in food.
   a) Conventional method.
   b) Newer technique.

UNIT-IV

7. Study of physical and chemical agents used in home and food industry for food preservation.
8. Methods of Preservation of food- Domestic and Commercial.

UNIT-V

9. Food illnesses -causative agents, symptoms, food involved and their prevention.
10. Industrial use of micro-organisms, yeast, moulds, fungi.

PRACTICAL:

4) Study and care of compound microscope, electron microscopes.
a) Microscope study of common bacteria responsible for food spoilage.
b) Examination of blood, feces, urine for the presence of micro-organisms.

References:

1.Food Microbiology, 1st Edition, M. R. Adams, 1995

2.Food Microbiology, 5th Edition, Frazier, Westhoff, Vanitha N M, 2014

3.Laboratory Methods in Food Microbiology , , 3rd Edition, Harrigan F.W, 2013

4.Fundamentals Food Microbiology, 4e ,Ray,2011

5.Pelczar, M.I. and Reid, K. D. (1978): Microbiology, McGraw Hill Company, New York

Course Code
NUTCC103

PAPER-3
INSTITUTIONAL FOOD ADMINISTRATION

Course Outcomes:

- On completion of this course, Students will be able to learn about various food services and entrepreneurial skills related to it.
- Understand the techniques that can be used to monitor quality of raw ingredients and final products.
- They can conduct appropriate sensory evaluation tests to answer specific questions regarding food attributes or consumer preferences

UNIT-I

1. **INTRODUCTION TO FOOD SERVICE SYSTEMS:**
   - Evolution of the food service industry.
   - Characteristics of the various types of food service units.

2. **APPROACHES TO MANAGEMENT:**
   - Theories of management
   - Aspects of management
   - Styles of management
   - Management tools.

UNIT-II

3. **STRATEGIES IN PLANNING :**
   - Conceptual strategy
   - Marketing strategy
   - Financial strategy.
   - Types of plans.

4. **MANAGEMENT OF RESOURCES** :
   - **Finance:**
   - Determining the finance needed to establish or run an unit
   - Budgets
   - Sources of finance
   - planning adequate cash flow
   - **Space And Equipment :**
   - Steps in planning layouts
   - Determination, Selection, Maintenance and placement of equipment
   - Layout analysis

UNIT –III

5. **MATERIAL:**
   - Menu planning
   - Planning for the material needed
   - Methods of selection
   - Storage
   - Services and modes of delivery.
6. **STAFF:**
   - Manpower planning &placement.
   - Recruitment, induction, training, motivation and performance appraisal.
7. **TIME AND ENERGY:**
   - Measures for utilization and conservation.

UNIT-IV

8. **TECHNO-ECONOMIC FEASIBILITY OF FOOD PRODUCTION/SERVICE ENTERPRISE COST ACCOUNTING /ANALYSIS:**
9. Food cost analysis.
10. Records to be maintained.
11. Reports and trend analysis.
12. **MARKETING AND SALES MANAGEMENT :**

- Marketing strategies.
- Sales analysis.
- Market promotion.

UNIT-V

13. **QUALITY ASSURANCE:**

- Food quality
- Total quality management
- Indian food laws and standards.

14. **COMPUTER AIDED RECORD MAINTENANCE AND MANAGEMENT:**

PRACTICALS:

1. Market survey of food service equipment.
2. Analysis of food safety and hygiene of kitchen of different institutions.
3. Planning menus for quantity.
   - Banquet
   - Outdoor catering.
   - Packed meals.
   - Restaurant.
4. Standardizing recipes for quantity 100,250,500.
5. Cost analysis of menus in
   - College canteen
   - Hostel mess
   - Hospitals, (private, charitable ,government).

References:

1. Sathe, A.Y., A First Course in Food Analysis,1999.
2. Sethi, Mohini, Catering Management :An Integrated Approach,2015.
3. Sethi, Mohini, Fasting and Feasting – Then and Now,2008.
4. Sethi, Mohini, Institutional Food Management,2004

PAPER-4

Course Code
NUTCC104

FOOD SCIENCE & EXPERIMENTAL COOKERY

Course Outcomes:

- Develops ability to determine the edible portion, effect of cooking on volume and weight.
- They learn to choose appropriate cooking method to conserve nutrients and thus acquire skills on different methods of cooking.
- It helps them analyze the factors affecting cooking quality of foods.
- They can create appropriate food preparation and processing methods to ensure standards in food industry.

UNIT-I

1. **CEREALS:** cereals and millets, nutritional aspect, cereal products, processing- changes during processing.
2. **PULSES:** Nutritional aspects, processing methods- effect of processing.

UNIT-II

3. **MIK AND MILK PRODUCTS :-** classification, nutritional aspect, processing.
4. **EGG:-** Nutritional aspect, grading, processing , uses in cookery.
5. **FISH, POULTRY AND MEAT**: nutritional aspect, selection , storage , spoilage.

UNIT-III

6. **VEGETABLE AND FRUIT:-** type, selection , processing, nutritional aspect.
7. **FATS AND OILS : -** classification, nutritional aspect, spoilage, processing.
8. **SUGAR AND SUGAR PRODUCTS**: forms of sugar, manufacture, selection, storage, processing- changes while processing.

UNIT-IV

9. **RAISING AGENTS: -** types, use in cookery.
10. **FOOD ADJUNTS:-** Spices, condiments, herbs, extracts, essences, food colours: uses, specifications, storage.

UNIT V

11. **APPLICATION FOR MODERN TECHNOLOGY IN IMPROVING FOOD AND NUTRITION SITUATION** : Leaf and grass protein , food yeast , algae , microbial synthesis of proteins from hydrocarbon.
12. **PALATABILITY OF FOOD AND MEASUREMENT OF ITS ACCEPTANCE:** sensory testing, appearance, smell and taste etc. Objective testing- density , volume, tenderness, tension, viscosity, weight, moisture.

PRACTICAL:

1. Food analysis – Proximate analysis
2. Food Analysis
   a- Milk – acidity, total solids
   b- Carbohydrates- reducing sugar.
   c- Oils and fats
   d- Fruits-Jams and jellies
   e- Meat, Fish and egg

Experimental cookery

1. Cereals and starches-stages of sugar cookery, batter and dough preparation.
2. **Pulses**: cooking of dry, sprouted and fresh pulses.
3. **Egg cookery:** - soft and hard cooked,
4. **Vegetables:** - changes occur during cooking, changes in flavor, color, texture and palatability.
5. **Fats and oils:** - emulsions, shortening value for frying.
6. **Fruits:**-raw and cooked, jams and jellies.

References:

- Potter, Norman N., and Joseph H. Hotchkiss. *Food science*. Springer Science & Business Media, 2012.
- Vaclavik, Vickie A., Elizabeth W. Christian, and Elizabeth W. Christian. *Essentials of food science*. Vol. 42. New York: Springer, 2008.
- Penfield, Marjorie Porter, Ada Marie Campbell, and Marjorie P. Penfield. *Experimental food science*. San Diego, CA: Academic press, 1990.
- Srilakshmi, B. *Food science*. New Age International, 2003.

PAPER-5

Course Code
NUTCC105

PRACTICALS

Course Outcomes:

- Study about different instruments used commonly in microbiology.
- Isolate and identify microbes.
- Assess the microbial factors that spoil food and determine the quality of given milk sample and water from different sources.
- Acquire skills in measurement of blood pressure, pulse, estimation of haemoglobin and identifying blood group and matching.

Human Physiology : As mentioned in Course code NUTCC101

Food Microbiology: As mentioned in Course code NUTCC102

Institutional Food Administration: As mentioned in Course code NUTCC103

Food science and Experimental Cookery: As mentioned in Course code NUTCC104

Food Preservation: As mentioned in Course code NUTVC101

PAPER 6

Course Code
NUTVC101

FOOD PRESERVATION

Course Outcomes:

- Understand the role of micro organisms in food spoilage
- Understand ambient temperature processing
- Distinguish between high and low temperature processing
- Know the principles of preservation behind the methods of preservation.

Practical:

1) Identification of lab equipment

2) Identification of class I & class II Preservatives.

3) Identification of spoiled food.

4) Preparation of products by using Salt as preservative.

5) Preparation of products by using Sugar as a preservative.

6) Preparation of products by using Oil as preservative.

7) Preparation of products by using Chemical Preservative.

9) On job training on food preservation unit.

References:

1. Fellows P J (2002), Food Processing Technology- Principles and Practices, 2nd Edition. Woodhead Publishing Ltd.
2. Harper J C, (1975) Elements of Food Engineering. A VI, West port.
3. Fennema O R, (1985), Principles of Food Science: Part- II Physical
4. Principles of Food Preservation. Marcel Decker New York
5. Peter S. Murano (2003), Understanding Food Science and Technology.

(18)

Course Code
NUTCC201

SEMESTER –II

PAPER-7

NUTRITIONAL BIOCHEMISTRY

Course Outcomes:

- On completion of this course, students will understand the principles of biochemistry and also chemistry of major nutrients.
- Know about the nutrients, its structure, type and metabolism.
- Recognize the importance of buffer systems in pH maintenance.

UNIT-I

1. INTRODUCTION: significance of pH , acid base balance.

2.CARBOHYDRATES: classification, structure, occurrence and utilization of glucose, carbohydrate metabolism. Glycogenesis and glycogenolysis, glycolysis, gluconeogenesis, TCA cycle, pentose metabolism.

3. Biological oxidation, electron transport chain, oxidative phosphorylation.

UNIT-II

4.PROTEINS: classification, structure and occurrence , metabolic dynamics and general pathways of proteins. Anabolism and catabolism of proteins. Endocrine influences in protein metabolism, urea cycle.

UNIT-III

5.LIPIDS: classification, structure, function , metabolism of lipids, oxidation of fatty acid(saturated and unsaturated) , metabolism of ketone bodies. Biosynthesis of phosphoglycerides, cholesterol, bile acid steroid hormones.

UNIT-IV

6.NUCLEIC ACID: compositions function, classification, structure and properties of DNA and RNA , regulation and transcription of genetic information , translation , genetic code , regulation of bio-synthesis.

UNIT-V

7.ENZYMES: role of enzymes in the intermediate metabolism of carbohydrates, protein and fats, their distribution inhibition, specificity mechanism of action, enzymes in clinical diagnosis.

8.HORMONES: mode of action and regulation of metabolism.

PRACTICAL:

CARBOHYDRATES: Qualitative test for carbohydrates, glucose tolerance test.

FATS: saponification number, iodine number, acid value, extraction of lipids from lipids from egg yolk, estimation of cholesterol and phospholipids in the extract.

AMINO ACID: qualitative test for amino acid, qualitative test for proteins, electrophoresis of serum.

Use of pH meter for determining the Ph of saliva and vegetable and fruit juices. Absorption spectrum of a biological compound using a spectrophotometer.

References:

- Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25th Ed. Harpers Biochemistry. Macmillan Worth Publishers.
- Nelson, D.L. and Cox, M.M. (2000): 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.
- Devlin, T.M. (1997): 4th Ed. Text book of Biochemistry with Clinical Correlations, Wiley Liss Inc
- Stryer, L. (1998): 4th Ed. Biochemistry, WH Freeman and Co.
- Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.
- Voet, D. Voet, J.G. and Pratt, C.W. (1999). Fundamentals of Biochemistry.
- Tietz, N.W. (1976) Fundamentals of Clinical Chemistry. WB Saunders Co.

Course Code
NUTCC202

PAPER-8

RESEARCH METHODS & STATISTICS

Course Outcomes:

- On completion of this course, students will be able to apply statistical tools in various fields in their practical life.
- They will be able to derive various statistical measures, interpret the data through Bar diagrams, visualize the correlation between the variables and thus can apply these statistical techniques in their reports or researches.

UNIT-I

1. RESEARCH: meaning, objectives, characteristics & significance.

2. TYPES OF RESEARCH: qualitative & quantitative.

3. BASIC ELEMENTS OF RESEARCH: variables – types- independent, dependent, active, attribute, continuous and categorical, characteristic and relationships,

UNIT-II

4. RESEARCH PROBLEMS: definition and statement, selection of the problem, evaluation of the problem.

5. HYPOTHESIS: definition, importance, formulation, characteristics, types-null, alternate, substantive, declarative and question and testing.

6. RESEARCH PROPOSAL: research proposal or synopsis, introduction, procedure for collecting and treating data, bibliography, time and budget schedule.

7. REVIEW OF RELATED LITERATURE: purpose of the review, identification of the related literature and organizing the related literature.

UNIT-III

8.DATA COLLECTION TOOLS OF RESEARCH:

- **DATA:** - qualitative and quantitative
- **TOOLS:** - objective and projective techniques, questionnaire and schedule, checklist and rating scale, interview, observation, sociometric techniques.
- **CHARACTERISTICS:-** Reliability, validity and usability of a data collection tool.

9.RESEARCH DESIGN: meaning, features, types.

10.RESEARCH REPORT: significance of report writing, types of report, different steps in report writing, layout of the research report, general format, style and format of writing, typing of research report, proof reading of the final draft, precautions of writing research reports.

UNIT-IV

11.STATISTICS: definition, aim, scope, importance and limitation of statistics.

12.DATA COLLECTION: classification, tabulation and methods of collecting data.

13.MEASURES OF CENTRAL TENDENCY & MEASURES OF DISPERSION: range, standard deviation, quartile deviation, coefficient of variation, skewness, kurtosis, uses of different measures of dispersion.

UNIT-V

14.CORRELATION AND REGRESSION: meaning, coefficient of correlation, product moment method, rank difference method. Definition of regression, coefficient and regression line.

15.PROBABILITY: definition, simple problems on probability, binomial distribution, normal distribution.

16.SMALL SAMPLE TEST: use of distribution, test for single mean, equality of mean paired- t test, test for equality of variance, chi- square test

17.ANALYSIS OF VARIANCE: analysis in one way classification and two-way classification utility and characteristics of ANOVA.

References:

- Best, JW and Kahn, JV (1992) Research in Education.6th ed. New Delhi, Prentice Hall of India Pvt. Ltd,.
- Kothari, CR (2004) Research Methodology, Methods & Techniques, 2nd ed. New Age International Publishers.
- Goode, WJ and Hatt, PK (1981) Methods in Social Research, McGraw Hill International Editions, Sociology Series.
- Kerlinger, FN (1983) Foundations of Educational Research. 2nd ed. • Marjory L. Joseph, William D Joseph (1996) Research Fundamentals in Home Economics / Human Ecology. Plycon Press.
- WHO (2001) Health Research Methodology – A Guide for Training in Research Methods.
- Argyrous, G. (2000). Statistics for Social and Health Research. London: Sage.

PAPER 9

NUTCC203 **ADVANCED NUTRITION**

Course Outcomes:

- Understand the biological processes and systems as applicable to human nutrition.
- Describe the biochemical and physiological functions of the nutrients and their integrated role.
- Evaluate the therapeutic role of key nutrients in maintaining health.

Unit 1

Modern concept of digestion, absorption and utilization of nutrients.

Carbohydrate: Role in nutrition. Energy metabolism.

Unit 2

Lipid: Role in nutrition, nutritional aspect of atherosclerosis. Interrelationship between Carbohydrates and fat metabolism.

Proteins: Role in Nutrition, nutritional classification, protein Quality, factors affecting protein and amino acid requirements.

Unit 3

Vitamins: Sources, Role in Nutrition, requirements, deficiency and toxicity

Minerals: Sources, Role in Nutrition, requirement, deficiency and toxicity. Factors affecting the availability.

Trace elements: sources , role in nutrition, deficiency and toxicity.

Interrelationship between vitamins and minerals

Unit 4

Water regulation: Intra and extra cellular volume, osmolality, water balance and its regulation. Body composition. Detoxification.

Inborn errors of metabolism - carbohydrate, protein, fat

Unit 5

Non-nutritive food components with potential health effects – polyphenols, tannins, phytates, phytoestrogens, cyanogenic compounds, lectins, saponins

Nutrition management in specific conditions – Space travel, high altitude, low temperature, submarine.

References:

- Bamji M.S., Rao N.P., Reddy V. Eds. (2009). Textbook of Human Nutrition. 3rd Edition. Oxford and IBH Publishing Co. Pvt. Ltd.
- Gibson, G.R. and M.B. Roberfoid (1999), Calonic microbiota, Nutrition and Health.Kulwer Academic Publishers, Dordecht.
- Whitney, E.R. and S.R. Rolfes (2009) understanding Nutrition 9th ed. Wadsworth Thomson, Learning, Australia.
- ICMR (1990). Nutrient Requirements and Recommended Dietary Allowances for Indians.
- Nutrition in Developmental Transition. NFI-WHO (SEARO) Symposium. NFI (2006).

PAPER 10

NUTCC204 **COMMUNITY NUTRITION**

Course Outcomes:

- Students gain knowledge on nutritional programmes and policies to overcome malnutrition.
- Understand the role of national, international and voluntary nutritional organizations to combat malnutrition.
- Become capable of organizing community nutrition education programme.

UNIT 1

1. Definition, concept, factors affecting community nutrition
2. Assessment of nutritional status of community.
    - Standards and methods of assessing the state of nutrition of individual and groups
    - Socio economic and demographic surveys
    - Dietary surveys, anthropometry, clinical, biochemical

UNIT 2

3. Health parameters
    - Vital statistics
    - Infant, toddler, maternal mortality
    - Birth rate, death rate, growth rate, immunization status, environmental factors

UNIT 3

4. Applied nutrition activities- dietary diversification.
    - Food fortification and enrichment- definition, need & programs

UNIT 4

5. Feeding programs for vulnerable groups
6. Nutritional Deficiency control programme- prevention for blindness (National Vit A program), National Iron and folic acid program, National Iodine Program

UNIT-5

7. Nutrition education- importance, organisation and evaluation
8. National & international organizations working in the area of nutrition/health

PRACTICAL

1. Preparation and use of Nutrition. Education ads – charts, posters , models, demonstration, etc
2. Assessment of Nutritional Status.
3. Diet survey for family, a small group or community.

References:

- Gibney M. J., Margetts, B.M., Kearney, J. M. Arab, I., (Eds) (2004) Public Health Nutrition, NS Blackwell Publishing.
- Gopalan, C. (Ed) (1987) Combating Under nutrition- Basic Issues and Practical Approaches, Nutrition Foundation of India.
- Kaufman M. (2007) Nutrition in promoting the public health strategies, principles and practices. Jones and Barlett Publishers.
- Park, K. (2009) Park's Textbook of Preventive and Social Medicine, 20th ed. Jabalpur M/s. Banarsidas Bhanot.

Course Code
NUTCC205

PAPER 11

MATERNAL AND CHILD NUTRITION

Course Outcomes:

- Through Maternal and Child Nutrition, students understand the nutritional requirement of adults, nutritional needs during pregnancy and lactation and physiological changes and hormones involved during pregnancy and lactation.

UNIT 1

1. Current nutrition and health status of women and children in India.
2. Changing concepts and controversies in maternal and child nutrition
3. Importance of maternal nutrition
    - Importance of Nutrition prior to and during pregnancy
    - Pre requisites for successful outcome effect of undernutrition on mother child dyad including pregnancy outcomes and maternal and child health – short term and long term, management.

UNIT 2

4. Physiology and endocrinology of pregnancy and embryonic and fetal growth and development
5. Nutritional requirements during pregnancy-
    - Adolescent pregnancy
    - Pregnancy and AIDS
    - Pregnancy and TB
    - Intrauterine growth retardation
    - Complications of pregnancy and management and importance of antenatal care
    - Congenital malformations, foetal alcohol syndrome and gestational diabetes mellitus.

UNIT- 3

6. Lactation
    - Physiology and endocrinology of lactation – synthesis of milk components, let down reflex , role of hormones, lactational amenorrhea, effect of breast feeding on maternal health.
    - Human milk composition.
    - Management of lactation – prenatal, breast feeding skill education. Rooming problems – Sore nipples, engorged breasts, inverted nipples, etc.
    - Exclusive breast feeding
    - Baby friendly hospital initiative
    - Breast feeding in the age of AIDS

UNIT 4

7. Infant physiology and pre term and low birth weight infants : implications for feeding management
8. Growth and development during infancy , childhood and adolescence.
9. Feeding of infants and children and dietary management

UNIT 5

10. Concept of small family – methods of family planning, ,merits and demerits
11. Policies and programs for promoting maternal and child nutrition and health.

PRACTICALS

1. Comparison of rural urban communities for –
   a. Determinance of malnutrition
   b. Types of Nutritional Problems in Mother and child
2. Critical Appraisal of exiting Interventions and programs in the voluntary sector and government and suggestion to improve the same vis a vis mother and child and their specific needs.
3. Development of a plan for a Nutrition intervention project in the community based on maternal and child nutrition
4. Development of low cost recipes suitable for various vulnerable group at micro, meso, macro level suitable for mother and children.
5. Field experience in operational nutrition program related to mother and child.

References:

- Bhutta, Zulfiqar A., et al. "Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost?." *The lancet* 382.9890 (2013): 452-477.
- Wu, Guoyao, et al. "Maternal nutrition and fetal development." *The Journal of nutrition* 134.9 (2004): 2169-2172.
- Geissler, Catherine, and Hilary J. Powers, eds. *Human nutrition*. Oxford University Press, 2017.
- Lanham-New, Susan A., et al., eds. *Introduction to human nutrition*. John Wiley & Sons, 2019.

PAPER 12

Course Code
NUTCC206

PRACTICAL

Course Outcomes:

- Qualitative test for Carbohydrate, proteins, amino acids
- Use of pH meter for determining pH of saliva, vegetable and fruit juices
- Development of low cost recipe at meso, micro and macro level
- Field experience in operational nutrition program related to mother and child.
- Preparation and use of nutrition educational aids-charts, poster, models, etc.
- Assessment of Nutritional Status
- Able to do diet survey in family or community level.

Nutritional Biochemistry: As mentioned in Course code NUTCC201

Community Nutrition: As mentioned in Course code NUTCC204

Maternal and Child Nutrition: As mentioned in Course code NUTCC205

Bakery Science: As mentioned in Course code NUTVNC201

PAPER 13

Course Code
NUTVNC201

BAKERY SCIENCE

Course Outcomes:

- An understanding about ingredients used for baking and how their characteristics are used to design , formulate and prepare bakery products as well as their nutritional qualities.
- Gain knowledge about the appropriate preparation, mixing, make-up, baking, decorating and presenting of baked products
- An understanding of recipes / formulations used in baking and confectionery.
- Ability to prepare a variety of nutritionally enriched baked goods and confectionery

PRACTICAL

1. Basic Concepts of Bakery

a) Ingredients & processes used for preparation of

- Cream cakes and sponge cakes
- Short crust pastry
- Breads, buns and pizza base
- Cookies and biscuits

b) Product characteristics, common bakery faults and corrective measures

c) Bakery equipment- Types, selection, operations and maintenance

2. Practical Training in Baking of

- Cream cake
- Sponge cake preparations
- Short crust pastry
- Breads, buns, dinner rolls and pizza base
- Biscuits and cookies

References:

- Dubey, S.C. (2007). Basic Baking 5th Ed. Chanakya Mudrak Pvt. Ltd.
- Raina et.al. (2010). Basic Food Preparation-A Complete Manual. 4rd Ed. Orient Black Swan Ltd.
- Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). *The Art and Science of*
- *Cooking: A Practical Manual,* Revised Edition. Elite Publishing House Pvt Ltd.

Course Code
NUTCC301

Semester –III
Paper-14

DIET THERAPY

Course Outcomes:

- On completion of this course, students can relate the causes, symptoms and onset of various types of diseases.
- They can comprehend dietary principles in planning therapeutic diets for disease conditions.
- They acquire professional diet counselling skills and can manage a dietary department at the capacity of a dietitian and can also become a health care professional.

UNIT 1

1. Introduction – Concept of diet therapy, purpose and principles of therapeutic diets and their classifications.
   Routine Hospital diets, fluid diet, soft diet, regular diet, preoperative and postoperative diet.
2. Basic concepts and methods of oral feeding, tube feeding, parenteral nutrition and intravenous feeding.

UNIT 2

3. Planning diets according to medical prescription and according to sociological and psychological condition of patients and calculation of diets for use in diet therapy
4. Diet of anemia, rickets and PEM.
5. Diet for Obesity and leanness
6. Diet in fever – Types, metabolism in fever, general dietary considerations for TB, typhoid.

UNIT 3

7. Diet in disease of GIT – Gastritis, duodenal ulcer, diarrhoea, constipation, celiac disease – etiology, symptoms, clinical findings, treatment, dietary modifications.
8. Liver Disease – Jaundice, cirrhosis, hepatic coma.
9. Diet for Hypertension and cardiac diseases

UNIT-4

10. Diet for Endocrine disorders- hyperthyroidism, Addison's disease, hyperparathyroidism
11. Diet in Diabetes Mellitus
12. Diet in Kidney diseases – acute and chronic, Nephritis, renal failure, urinary caliculi, symptoms, etiology, dietary management

UNIT- 5

13. Diet in rheumatism, gout and arthritis
14. Diet in Skin disease, allergy and migraines.
15. Diet in dental diseases.
16. Diet and drug interaction

PRACTICAL

Planning and preparation of following diets-

1. Soft and low fiber diet
2. High calorie diet
3. Diet with specific restriction of any nutrient for Ex, Na, Purine,Gluten
4. Diet for fevers
5. Diabetic diet – food exchange list
6. Diet of kidney failure, kidney stones, for nephritis.
7. Diet for anemia, PEM.

References :

- Mahan, L. Kathleen. *Krause's food, nutrition, & diet therapy*. Ed. Sylvia Escott-Stump. Vol. 11. Philadelphia: Saunders, 2004.
- Lutz, Carroll A., Erin Mazur, and Nancy Litch. *Nutrition and diet therapy*. FA Davis, 2014.
- Krause, Marie V. *Food, nutrition and diet therapy*. Saunders, 1979.
- Williams, Sue Rodwell. "Nutrition and diet therapy." *Nutrition and diet therapy*. (1969

PAPER 15

NUTCC302 **PRACTICAL**

Course Outcomes:

- Planning diets for various conditions based on the nutrient requirements.
- Gain knowledge about the role of diet, nutrients and various foods in the maintenance of health and to prevent diseases.

Diet Therapy: As mentioned in Course code NUTCC301

PAPER 16

NUTEL301A **NUTRITIONAL EPIDEMIOLOGY**

Course Outcomes:

- Students develop skill in using epidemiologic concepts and methods to examine nutritional aspects of health and disease in populations.
- Develop skills in the measurement of nutritional parameters in population-based studies of health and disease

UNIT-1

1. Introduction to epidemiology and branches of epidemiology
   - Types of Epidemiology
2. Epidemiological Information : Collecting epidemiological data, Secondary Routine Data.

UNIT-2

3. Patterns of Disease:
   - Descriptive Epidemiology, Cross sectional Analysis, Prevalence and Incidence, Risk factors, Risks and odds
   - Relative and attributable risks.
4. Principles of Nutritional Epidemiology

UNIT-3

5. Measurement issues, Measurement of disease, occurrence and measures of association , exposure and outcome.
6. Assessment of food consumption

UNIT-4

7. Biochemical markers of nutrient intake and nutritional status
8. Socio demographic and psycho social variables.
9. Anthropometric indices

UNIT-5

10. Design and planning of nutritional epidemiological studies
11. Assessing , applying and evaluating epidemiological studies.

References

- Anisha Basheer (1995) Environmental Epidemology, Rawat Publications, Jaipur
- Margetts B.M and Nelson M (1998) Design concepts in Nutritional Epidemiology, Oxford, New York.
- Moon G, Gould M (2000) Epidemiology: an introduction, open university press, Philadelphia.
- Cox, B. Blaxter, M.,Bucle A et al (1987)Health and lifestyle survey, 1984-85. Health Promotion research trust, London
- Farmer R Miller D and Lawerson R (1996) Lecture Notes on Epidemology and Public Health Medicine, Oxford, New York.
- Janes C, Stall R and S Gifford (1986) Anthropology and Epidemiology: Interdisciplinary approaches to the study of health and Disease Reidel , Dordrecht.

NUTEL301B **FUNCTIONAL FOODS**

Course Outcomes:

- Students will know what are functional foods, their types, functions and importance in today life.
- They can clearly define antioxidants, pre and probiotics and nutraceuticals

UNIT 1

FUNCTIONAL FOODS

Functional foods – Evolution and Definition of functional foods.

Health benefits of functional foods and future promises in Indian diet.

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Dietary Fibre. Oligosaccharides. Resistance starch. Omega 3 fatty acids .

UNIT 2

Colonic functional foods -Definition, types.

Probiotics- definition, types,

Health benefits of probiotics in gastrointestinal health, cancer, and other diseases,

Recent advances in probiotics – Lactobacillus, Lactobacillus casei, L. casei strain Shirota.

Prebiotics- definition, types, Health benefits of prebiotics, Recent advances in prebiotics-galacto-oligosaccharides (GOS), functional disaccharides (lactulose, lactitol and lactose), Resistant starch (RS), Prebiotic ingredients in foods.

UNIT 3

NUTRACEUTICALS - Definition, Sources. Classification of nutraceuticals based on chemical nature. Phytochemicals as nutraceuticals – Isoprenoids, polyphenolics, glucocyanovates, phytosterols, dietary fiber .

Significance and relevance of nutraceuticals in the management of disease and disorders –.

UNIT 4

PHYTOCHEMICALS: Definition, mode of action

Poly Phenols: A. Non Flavonoid polyphenols, B. Flavonoids - Flavanols, Flavanol (Catechin) Flavan-3-ol, Flavones, Flavanones, Anthocyanidins, Phytoestrogens (isoflavonones), C. Other Poly Phenols: Curcumin, Tannins, Lignan and Resveratrol

UNIT 5

ANTIOXIDANTS- Formation of Free Radicals, Reactive Oxygen Species and oxidative Stress. Antioxidant Definition and Mechanism of action and Classification -Endogenous and Exogenous

References:

- Henry, C. J. "Functional foods." *European Journal of Clinical Nutrition* 64.7 (2010): 657-659.
- Weststrate, J. A., G. Van Poppel, and P. M. Verschuren. "Functional foods, trends and future." *British Journal of Nutrition* 88.S2 (2002): S233-S235.
- Kaur, Sumeet, and Madhusweta Das. "Functional foods: an overview." *Food Science and Biotechnology* 20.4 (2011): 861.
- Wildman, Robert EC, ed. *Handbook of nutraceuticals and functional foods*. CRC press, 2016.
- Goldberg, Israel. *Functional foods: designer foods, pharmafoods, nutraceuticals*. Springer Science & Business Media, 2012.

PAPER 17

NUTEL302A FOOD SAFETY AND QUALITY CONTROL

Course Outcomes:

- Students can understand the introduction to food safety and issues in India and can learn about the applications of safety management in food industry.
- They can define different food laws and regulations for quality management in food industry.

UNIT-1

1. Introduction to quality assurance and food safety assurance. Current concepts of quality control.
2. Agencies involved in food safety- national & international.
3. FSSAI- role & responsibilities.

UNIT -2

4. Quality assurance programme: Quality plan, documentation of records.
5. Product standards. Product and Purchase specifications, process control and HACCP.

UNIT- 3

6. Hygiene and housekeeping, corrective action, quality and programme and total quality process.
7. Quality Costs: Measurement and Analysis

UNIT- 4

8. Product Evaluation:
    - Sampling for product evaluation and line control
    - Statistical data and process control
    - Specifications and food standards , International, National – Mandatory, Voluntary
    - Sample Preparation
    - Reporting Results and reliability of analysis

UNIT- 5

9. Tests for specific raw food ingredients and processes foods including additives:
    a. Proximate principles
    b. Nutrient analysis
    c. Quality parameters and tests of adulterants
10. Consumer protection

References

1. Early R (1995) Guide to quality management systems for the food industry, Blackie, Academic and professional, London
2. Gould WA and Gould RW (1988) Total quality Assurance for the food Industries, CTI Publications Inc, Baltimore.
3. Pomeranz Y and Me Loan CE (1996) Food Analysis: Theory and Practice, CBS Publishers and Distributor, New Delhi
4. Askar A and Treptow H (1993) Quality assurance in Tropical Fruit Processing – Verlag Berlin
5. World health organisation (1998) : Guidelines for Drinking water quality . 2nd edition vol 1,2 and 3 , Geneva.
6. Marth E.H (1978) Standard Methods for the Examination of Dairy Products. 14th ed. Interdisciplinary books and periodicals, Washington DC

NUTEL302B SENSORY EVALUATION OF FOOD

Course Outcomes:

- Learn how what actually is sensory evaluation, different methods of evaluating the product.
- Learn how to implement the theory of sensory evaluation in real life

UNIT 1

Introduction to sensory analysis and uses of sensory tests. Neural networks in sensory perception. General testing conditions. Selection of test subjects and training of panel.

UNIT 2

Types of tests:

- Discriminative / difference test : Paired test, triangle test and duo- trio test: tests for multiple samples, difference from control/ reference
- Quantitative Difference tests: ranking, numerical scoring test, magnituse estimation.
- Descriptive tests: Rating for sensory profile, consensus profiling, conventional profiling, free choice profiling

UNIT 3

- Threshold tests
- Acceptance tests : Monadic, paired and sequential monadic

UNIT 4

- Designing of questionnaire, and

- Evaluation scorecard

UNIT 5

Consumer acceptability using sensory evaluation- Introduction, definition of consumer, understanding consumer behavior.
Factors influencing product acceptance

References:

- Amerine, Maynard A., Rose Marie Pangborn, and Edward B. Roessler. *Principles of sensory evaluation of food*. Elsevier, 2013.
- Lawless, Harry T., and Hildegarde Heymann. *Sensory evaluation of food: principles and practices*. Springer Science & Business Media, 2013.
- O'Mahony, Michael. *Sensory evaluation of food: statistical methods and procedures*. Routledge, 2017.
- Jellinek, Gisela. *Sensory evaluation of food. Theory and practice*. Ellis Horwood Ltd., 1985.

PAPER 18

Course Code NUTIN301

INTERNSHIP REPORT AND VIVA VOCE

Course Outcomes:

- Students will be able to learn the practical aspects and field experience of Nutrition Counselling and Diet therapy
- Learn communication skills by interacting with patients.
- Learn to describe the practical experiences into written report and defend the same.

PAPER 19

Course Code NUTIER 301

FOOD TOXICOLOGY

Course Outcomes:

- This course is designed for students to familiarize with hazards and toxicity associated with food and their implications for health.
- Learn about the various kinds of hazards and familiar with various tests.

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UNIT 1

1. Introduction to food safety and toxicology – hazards – microbial, nutritional, environmental, natural toxicants, pesticide residue and food additives

UNIT II

2. Assessment of food safety
    - Risk assessment and risk benefits
    - Indices of human exposure

UNIT 3

3. Food additives, types & specification as per FSSAI
4. Intentional direct additives: Preservatives, nitrates, nitrite N – nitroso compounds.

UNIT 4

5. Indirect additives, residues and contaminants : multi – contaminant studies.
6. Anti microbial and veterinary drugs, pesticides , polyhalogenated aromatic hydrocarbons, polycyclic aromatic hydrocarbons.

UNIT- 5

7. Other organic residues, packaging materials, heavy metals, radio nuclides in food.
8. Toxic effects of adulterant on human health.
9. Preventive measures & awareness strategy.

References:

- Shibamoto, Takayuki, and Leonard F. Bjeldanes. "Introduction to food toxicology." (2009).
- Kotsonis, Frank N., and George A. Burdock. "Food toxicology." *Casarett and Doull's Toxicology: The Basic Science of Poisons* (2008): 1191-1236.
- Deshpande, S. S. *Handbook of food toxicology*. CRC Press, 2002.
- Concon, Jose M. *Food toxicology. Part A: Principles and concepts; Part B: Contaminants and additives*. Marcel Dekker Inc., 1988.

SEMESTER IV

Course Code
NUTCC401

Paper-20
Food Product Development

Course Outcomes:

- This paper will help them to know the recent concepts in food product development
- Choose appropriate packaging materials and interpret labelling information as the students learn and are aware about the governing food packaging and labelling.
- Develop their own unique, nutritious food product.

UNIT-I

1.Market and consumer research: Needs, types of food consumption trends. Economic, psychological. Anthropological and sociological dimensions of food consumption pattern.

2.Trends in social change and its role in diet pattern, using social trends as a frame work in new product innovation.

UNIT II

3. Food situation in India and outside. Tapping the unconventional post harvest losses and prospects for processing for export.

4. Traditional food: Status and need for revival in the context of westernized non-traditional foods. Factors affecting the emerging need.

UNIT III

5. Product development: Primary processing,
Secondary processing
Types of products eg.: Quick cooking,
Fast foods,
Convenience food.

6. Recipe standardisation and large scale preparation.

UNIT-IV

7. Packaging- packaging suitability and functions development and management, design package graphics, labeling research and testing.
8. Transportation, types modes, optimization of transportation taking into account type of product, distance, storage, facilities etc.

UNIT-V

9. Sensory evaluation and product testing, procedure and prerequisites
10.Costing of product.

References:

- Rudolph, Marvin J. "The food product development process." *British Food Journal* (1995).
- Linnemann, Anita R., et al. "Consumer-driven food product development." *Trends in Food Science & Technology* 17.4 (2006): 184-190.
- Fuller, Gordon W. *New food product development: from concept to marketplace*. CRC Press, 2016.

Course Code
NUTEL401A

PAPER 21

NUTRITION IN EMERGENCY AND DISASTER

Course Outcomes:

- This course is designed to familiarize students with various natural and manmade emergencies and disasters and its impact on nutrition and health status.
- Understand the fundamental concepts of Disaster management.
- They understand the concepts in disaster mitigation and application of the principles of massive supplementary feeding and food safety during disasters.

UNIT 1

1.Natural/manmade disaster resulting in Emergency situations – famine, drought, earthquake, flood, cyclone, war, civil and political emergencies

2.Nutritional problems in emergencies in vulnerable groups – PEM, causes of malnutrition in emergency situations, major deficiency diseases

UNIT 2

3. Nutritional problems in emergencies in vulnerable groups – PEM, causes of malnutrition in emergency situations, major deficiency diseases

4. Communicable disease : surveillance and treatment.

UNIT 3

6. Control of communicable diseases in emergencies – role of immunization and sanitation

7.Assessment and surveillance of Nutritional status in emergency affected populations – Anthropometric assessment of nutritional status, MUAC

UNIT 4

8.Nutritional relief and rehabilitation – assessment of Nutrition needs in Emergency situations, therapeutic feeding , household food security and nutrition in emergencies

UNIT-5

9.Public nutrition approach to tackle nutritional problems in emergencies, supplementary feeding to control SAM & MAM (Severely Acute malnutrition & moderately acute malnutrition).

10. Nutrition interventions to control nutrient deficiency disorders in emergency situations.

11.Preventive measures & strategies to control communicable diseases during emergencies

References:

- Masefield, Geoffrey Bussell. "Food and nutrition procedures in times of disaster." *Food and nutrition procedures in times of disaster.* (1967).
- Wright, M., and Maija Vesala-Husemann. "Nutrition and disaster preparedness: focusing on vulnerability, building capacities." *Online J Issues Nurs* 11.6 (2006).
- World Health Organization. *The management of nutrition in major emergencies*. World Health Organization, 2000.
- Young, Helen, et al. "Public nutrition in complex emergencies." *The Lancet* 364.9448 (2004): 1899-1909.

(42)

Course Code
NUTEL401B

GERIATRIC NUTRITION

Course Outcomes:

- They learn about the Nutritional Requirement in geriatrics
- Problems faced and changes seen in old age people eventually affecting their health.

UNIT – 1

Introduction to geriatric care- concept of gerontology

- Ageing - Biology of ageing
- Interaction between physiological and social processes in ageing

UNIT 2

Dietetics of Geriatric care-Nutritional requirement

Food requirement, dietary modification

UNIT 3

Issues and challenges of ageing related to Nutrition – economic dependence/ poverty, elderly in rural/ urban area. Isolation, Loneliness and Dependency

UNIT 4

Nutritional related problems of old age- osteoporosis, obesity, neurological dysfunction

UNIT 5

Policies and programmes of the government and NGO sector pertaining to the elderly

References:

- Morley, John E., and David R. Thomas, eds. *Geriatric nutrition*. CRC Press, 2007.
- Chernoff, Ronni. "Geriatric nutrition: the health professional's handbook." (2013).
- Natow, Annette B., and Jo-Ann Heslin. *Geriatric nutrition*. CBI Pub. Co., 1980.
- Roe, Daphne A. "Geriatric nutrition." *Clinics in geriatric medicine* 6.2 (1990): 319-334

(43)

Course Code
NUTEL402A

Paper-22

NUTRITION IN HEALTH AND FITNESS

Course Outcomes:

- Through this elective subject, students develop comprehensive skills and become professionals in public health nutrition Become professionals in Public health Nutrition.
- They get opportunities in government and NGOs as public health nutritionist and understand Concept of Fitness Training.
- Learn to prevent and Manage Lifestyle related Disorders.
- Understand the importance of exercise and utilise it in Stress and Health Management

UNIT – I

1. Definition of health and wellness – Factors affecting health and wellness. Physiological, psychological and social health

UNIT II

2. Fitness – Definition, basic components of physically active lifestyle in preventing obesity, osteoporosis , heart disease and diabetes.

UNIT III

3. Nutrition and exercise –types of exercises(aerobic and anaerobic exercises), metabolic changes & their impact on energy requirement.

UNIT IV

4. Importance of exercise in preventing life style diseases – Diabetes, CVD , hypertension, Obesity and Osteoporosis.

UNIT V

5. Sports Nutrition – Special foods, Dietary modifications and diet plan, sports supplementation.

References:

1.ACSM, *ACSM's Guidelines for Exercise Testing and Prescription*, Sixth Ed. New York, Lippincott Williams & Wilkins, 2000
2.Avellini, B. A., Shapiro, Y., & Pandolf, K. B.*Cardio-Respiratory Physical Training in Water and on Land*
3.European Journal of Applied Physiology and Occupational Physiology, (1983) 50, 255-263.
4.Borton, Benjamin. *Human Nutrition.*
New York: McGraw-Hill, 197

(44)

Course Code
NUTEL402B

.NUTRITION AND HEALTH OF WOMEN

Course Outcomes:

- Learn about the Nutritional Requirement of women
- Understand the various health problems faced by women at different ages and ways to manage them.

UNIT 1

1. Role of women in National development
2. Impact of globalization on women

UNIT 2

3. Women in family and community
4. Women, work and health hazards

UNIT 3

5. Women's nutritional requirements and dietary considerations

UNIT 4

6. Women and health – Health facilities, gender and health, women pregnancy and lactation.

UNIT 5

7. Issues related to reproductive health of women.

References:

1.Shubhangini A. Joshi,(1992)" "Nutrition and Dietetics"Tata Mc Grow- Hill publishing Company Ltd, New Delhi.

2. Srilakshmi. B – "Nutrition Science", V Edn, New Age International (P) Ltd, Publishers, Chennai, 2007.

3. Passmone R.and Eastwood M.A,(1986), "Human Nutrition and Dietetics",English language book Society/Churchill Livingstone,Eigth edition, Hong Kong.

4. Neiman N. Catherine, (1990), "Nutrition",Wm.C. Brown Publishers. USA.

5. Robinson's Basic Nutrition and Diet Therapy (8th Edition) Emma S. Weigley; Donna H. Mueller; Corinne H. Robinson Published by Prentice Hall, 1996

(45)

PAPER 23

Course Code NUTMT401 **DISSERTATION**

(REPORT AND VIVA VOCE)

Course Outcomes:

- Students gain confidence and become capable of doing researches or writing research and review papers.
- They can continue their education and become PhD scholars and contribute in research.

The students have to complete and submit a dissertation related to Nutrition.

Course Code
NUTIRA401

PAPER 24
RESEARCH TECHNIQUES AND INSTRUMENTATION

Course Outcomes:

- Students learn about the basic concepts and principles of biochemical techniques namely Spectrophotometry, Fluorimetry, Chromatography and Centrifugation.
- They can identify the compounds by various biochemical techniques and interpret the results.
- They are capable of applying the laboratory skills and concepts in carrying out experiments using sophisticated instruments.

Theoretical basis, principles of laboratory techniques used in research and experimentation in nutrition.

UNIT-1

1. **Research Technique-Elementary Techniques:**
   a. Heating and cooling bath
   b. Mechanical agitation
   c. Distillation
   d. Filtration with section

UNIT-II

2. **Collection of specimen for analysis:**
   a. Food
   b. Feces
   c. Urine
   d. Blood
   e. Tissues

3.Methods: Methods used in chemical analysis: Moisture, ash, total calcium, phosphorus, iron and vitamin-C

UNIT-III

4.Physico-chemical principles involved in colorimetry, spectrometry.

5.Atomic absorptiometry, flame photometry, pH measurement and their application.

UNIT-IV

6. Chromatography: Principles of absorption, ion exchange and gas liquid chromatography and their application.

7.Electrophoresis: Principle, paper and gel electrophoresis and application in separation of proteins.

UNIT-V

8.Isotopes and radio-active substances: Their characteristics detection, measurements and use in nutritional research.

9.Principle of radio-immuno-assay and micro-biological assay and uses.

References:

1. "Instrumental Methods of Analysis" by Willard and H Merrit

2."A Laboratory Manual of Food Analysis" by Shalini Sehgal,

3. "Introduction to Chemical Analysis of Foods" by S S Nielsen,

4. "Food Analysis Laboratory Manual (Food Science Text Series)" by S Suzanne Nielsen,