

KanyaMahaVidyalaya Jalandhar City

(An Autonomous College)



**KANYA MAHA VIDYALAYA, JALANDHAR
(UGC Autonomous College)**

KANYA MAHA VIDYALAYA, JALANDHAR
(UGC Autonomous College)
Department of Food Science and Microbiology
Meeting by Circulation

Proceedings of the Meeting of Board of Studies held on 20-05-2021

In the light of current lockdown in the country due to pandemic COVID-19, sixth meeting of the board of studies could not be held in person. The zoom meeting for the same was held on 20-05-2021 at 10:00am. The detailed suggestions/discussions on agenda items reached to Chairperson via email at foodsciencemicro@ymail.com by 21-05-2021.

Date: Thursday, 20-05-2021

Time: 10:00 am

Venue: Online meeting at Zoom

Following Members of the Board of Studies attended the meeting:

1.	Mrs. SadhnaTandon, Head of department/Dean of Life Sciences, K.M.V, Jalandhar (Chairperson)	Present
2.	Dr. Dalbir Singh Sogi, Professor, G.N.D.U Amritsar (University Nominee)	Present
3.	Dr. Charanjiv Singh Saini, Professor, SantLongowal Institute of Engineering and Technology, (Longowal, Distt. Sangrur) (Outside Parent University Nominee)	Present
4.	Dr. Kamlesh Prasad, Professor, SantLongowal Institute of Engineering Technology, (Longowal, Distt. Sangrur) (Outside Parent University Nominee)	Present

The Chairperson Mrs. SadhnaTandon welcomed the members of Board of Studies. She apprised the members that during the COVID-19 pandemic, technologies are playing a crucial role in keeping our society functional. As KMV always keep pace with time so we took all steps for timely completion of syllabus through LMS, Video lectures etc. Students were assessed time to time using these tools and we have been able to monitor them on regular basis.

She took up the agenda items for deliberation one by one with the permission of committee members.

Item: FoodSci& Micro 6:2021:1 To confirm the Proceedings of fifth BOS and Action Taken Report.

The chairperson sent the proceedings of the previous Board of Studies and Action Taken Report meeting held on 24-11-2020 through email to all the members and they approved it through Zoom meeting. **(attached herewith as Annexure A)**

The house approved the Item: FoodSci& Micro 6:2021:1

Item: Food Sci & Micro 6: 2021: 2 To discuss the syllabus of Food Science in Bachelor of Science (Medical), Semester (I, II, III, IV, V & VI) under continuous evaluation system for the session 2021-22.

Discussions were made regarding minor rearrangements in the contents, addition of new topics.

Following changes were incorporated in **Food Chemistry and nutrition** paper (Sem I) :-

1. Following topics were suggested to **be Replaced**:

- **In unit-IV**, it was suggested to replace the topic “Egg” **with the topic** “Egg and poultry” It was suggested to replace the topic “Meat” **with the topic** “Meat and Fish” It was suggested to rearrange the topic “vegetables and fruit” **with the topic** “Fruits and Vegetables.”

2. It was suggested to remove the following topics:

- **In unit –II**, Enzymes- Nomenclature, definition, specificity, catalysis, enzyme kinetics, factors influencing enzyme activity, controlling enzyme action, role of enzymes in food processing, modification of food by endogenous enzyme and enzyme inhibitors in foods.
- Flavors –Types of flavors.

3. It was suggested to shift the following topics:

- **In unit-I**, they suggested to shift the following topics from **unit I to unit II**:-
“**Carbohydrate**—composition, classification, food sources, storage in body, reaction, structure, functions of mono, oligo and poly-saccharides in foods”,
“**Fat and oils**—composition, saturated, unsaturated fatty acids, food sources, functions of fats. Nomenclature and classification, emulsions and emulsifiers, role of fat and oil in food processing,”
“**Proteins** — composition, essential and non-essential amino acids, sources of protein, functions, protein deficiency diseases, physico-chemical properties, modification of food protein during processing and storage.”
- **In unit-II**, they suggested to shift the topic, “Recommended dietary Requirements- Nutrient requirement for adult men and women as per ICMR” to **unit-I**.

Following changes were incorporated in **Food Processing and Packaging** paper (Sem III)

1. Following topics were suggested to be replaced:

- **In unit-I**, the Board suggested to replace the topic, “Chemical preservation in food processing, chemical changes in food that affect the texture, color, flavor, odor, stability and nutritive quality during processing and storage” with the **Topic** “Chemical preservation in food processing.”
 - **In unit-III**, it was suggested to replace the topic “Processing of spices and flavor” **with the topic** “Spices and flavors.”
2. It was suggested to add the following topic:
 - **In unit-II**, they suggested to add the Topic “Enzymes: Definition, factors affecting enzyme activity, role of enzymes in food processing.”
 3. It was suggested to rearrange and shift the following topic:
 - **In unit III**, it was suggested to rearrange **the topic from** Manufacturing process: Extruded foods **to the topic** “Extruded foods” **and was shifted from unit III to unit II.**
 4. It was suggested to remove the following topic:
 - **In unit II**, it was suggested to remove the topic “Quality control in food industry- methods of evaluation and control of the various aspects of quality of raw materials, manufacturing process and the testing of finished products.”
 - **In unit IV**, it was suggested to remove the following topic, “food and food package interaction.”
 5. Correction of spelling:
 - **In unit-III**, the spelling of bear was corrected to “beer.”
 6. It was suggested to rearrange following practicals:
 - It was suggested **to rearrange** the practical **from** To determine grease resistance of packaging material **to** To determine the strength of different packaging material.
 - It was suggested **to rearrange** the practical **from** To see the chemical resistance of packaging materials **to** To check the chemical resistance of packaging materials.
 - It was suggested **to rearrange** the practical **from** Adequacy of blanching **to** To check the adequacy of blanching.

Following changes were incorporated in **Quality Assurance** paper (SemIV)

1. It was suggested to add the following topic:
 - **In unit-I**, it was suggested to add the topic, “Quality control in food industry- methods of evaluation and control of the various aspects of quality of raw materials, manufacturing process and the testing of finished products.”

Following changes were incorporated in **Food Analysis** paper (SemV)

1. It was suggested to remove the following topic:

- **In unit-III**, it was suggested to remove the topic, “Polarography.”
2. It was suggested to remove the following practicals:
 - Lactometric determination
 - Refractrometry
 - Polarimetry and polarography
 - Food Rheology
 3. It was suggested to add the following practicals:
 - Determination of milk quality by lactometer
 - To find out the TSS of food sample by refractrometer.
 - Determination of surface tension of food sample by using drop number method.
 - Determination of viscosity index of food sample.
 4. It was suggested to rearrange the following practical:
 - It was suggested to rearrange the practical from Proximate composition of food to Proximate composition of different types of food.

Following changes were incorporated in **Food plant layout and managment** paper (SemVI)

1. It was suggested to remove the following practical:
 - Determination of BOD/COD.

The needful was done according to the suggestions given. The proposed syllabus has been approved for semester I, II, III, IV, V and VI for session 2021-22. **(Approved syllabus attached herewith as Annexure B.)**

The house approved the Item:FoodSci& Micro 6: 2021: 2 with recommended changes.

Item:FoodSci& Micro 6: 2021: 3 To discuss the syllabus of Microbiology in Bachelor of Science (Medical), Semester I,II,III, IV, V & VI under continuous evaluation system for the session 2021-22.

The proposed syllabus has been approved for semester I,II,III, IV, V and VI for session 2021-22. **(Approved syllabus attached herewith as Annexure C.)**

The house approved the Item:FoodSci& Micro 6: 2021: 3 with recommended changes.

Item:FoodSci& Micro 6: 2021: 4 To discuss and approve list of proposed examiners for above stated courses. **Proceedings:**

List of Paper setters and evaluators were purposed by Internal committee members and were approved. **(Lists attached herewith as Annexure D)**

The house approved the Item:FoodSci& Micro 6: 2021: 4

Item:FoodSci& Micro 6: 2021: 5To discuss teaching methodologies adopted in department and inputs required to upgrade the same.

- The chairperson explained the house that whole syllabus was covered by the teachers through online classes(e-classes). The Learning Management System (LMS) of college is beneficial for the students for their studies in the pandemic period of Covid-19. All the modules are covered by uploading e-notes on LMS, e-mails and whatsapp. Queries were also solved on WhatsApp groups. Even their Mid semester examination was conducted by on line methods. Our Department is well equipped with instruments, e-content, powerpoint presentations and demonstrations for better understanding of concepts. The department is doing excellent work for hands on training to students by extended practical, projects and online assignments. The activities like Product development of seasonal foods(food stall), workshops, quiz, and industrial visit for overall development of students and to create passion for science are regularly organized. BOS member appreciated the teaching methodologies of department. The students can learn the preparation of various fermented and fortified foods. **(attached herewith as Annexure E)**

The house approved the Item:FoodSci& Micro 6: 2021: 5

Item:FoodSci& Micro 6: 2021: 6 To discuss the outcome of above stated courses.

Following changes were incorporated in outcomes of Food Chemistry and Nutritionpaper (Sem I) :-

1. Following outcomes were suggested to be rearrange:

FROM:

- **CO1:** Understand food, its functions, food groups, malnutrition and nutrient requirement for adult men and women as per ICMR.
- **CO2:** Understand the chemistry underlying the properties of various food components.
- **CO3:** Understand digestion, absorption, transport and utilization of nutrients in the body.
- **CO4:** Learn about the nomenclature, definition, specificity, catalysis of enzyme, factors influencing enzyme activity and role of enzymes in food processing.
- **CO5:** Understand the composition and nutritional significance of cereals, milk and milk products, egg, meat, fruits and vegetables.

TO:

- **CO1:** Understand food, its functions, food groups, food digestion, absorption, transport and utilization of nutrients in the body.
- **CO2:** Understand nutrition, malnutrition and nutrient requirement for adult men and women as per ICMR.
- **CO3:** Understand the composition and nutritional significance of cereals, milk and milk products, egg, meat, fruits and vegetables.

- **CO4:** Understand the chemistry underlying the properties of various food components.

Following changes were incorporated in outcomes of Food Processing and Packaging paper (Sem III) :-

1. Following outcomes were suggested to rearrange:
 - **CO1:** Understand the reasons of spoilage and basic principles of food preservation methods.
 - **CO2:** Understand packaging materials, characteristics and machinery used for packaging food.
 - **CO3:** Understand processing of fats, oils, sugar, salt, tea, coffee, chocolate and cocoa powder, spices and flavor and extruded foods.
 - **CO4:** Learn manufacturing of fermented products: wine, vinegar, beer, fermented milks, yoghurt, etc.
 - **CO5:** Understand techniques that can be used to monitor quality of raw materials, manufacturing process and testing of the finished products.

TO:

- **CO1:** Understand the reasons of spoilage and basic principles of food preservation methods.
- **CO2:** Understand different types of packaging materials, their properties and packaging machinery used in packaging of food.
- **CO3:** Understand processing of fats, oils, sugar, salt, tea, coffee, chocolate and cocoa powder, spices and flavor and extruded foods.
- **CO4:** Learn manufacturing of fermented products: wine, vinegar, beer, fermented milks, yoghurt, etc.

Following changes were incorporated in outcomes of Food Analysis paper (Sem V) :-

- Following outcomes were suggested to rearrange:
- **CO1:** Understand the nutritional importance of food.
- **CO2:** Understand the chemical and biochemical composition of foods and their importance for health, well being and safety of consumers
- **CO3:** Understand physical characteristics of foods with special reference to rheological behavior and textural characteristics.
- **CO4:** Understand the basics of chromatography techniques to separate and identify various biological molecules with special reference to amino acids, carbohydrates, lipids, nucleic acid, and proteins.
- **CO5:** Understand the importance of legal standard, quality assurance, nutritional value determination and adulterants detection.

TO:

- **CO1:** Understand the chemical and biochemical composition & nutritional importance of foods and their importance for health and safety of consumers
- **CO2:** Understand physical characteristics of foods with special reference to rheological behavior and textural characteristics.

- **CO3:** Understand the basics of chromatography techniques to separate and identify various biological molecules with special reference to amino acids, carbohydrates, lipids, nucleic acid, and proteins.
- **CO4:** Understand the importance of legal standard, quality assurance, nutritional value determination and adulterants detection.

The needful was done according to the suggestions given. The proposed outcomes has been approved for semester I,II, III, IV , V & VI for session 2021-22.

Course outcomes of Microbiology of B.Sc. Medical (Semeste, I, II, II,IV, V& VI) for session 2021-22 has been (**approved attached herewith as Annexure B&C.**)

The house approved the Item:FoodSci& Micro 6: 2021: 6 with recommended changes.

Item:FoodSci& Micro 6: 2021: 7 To discuss the course scheme and detailed syllabus for above stated programmes.

Approved syllabus and course scheme of B.Sc Medical (Semester I, II, III, IV,V &VI) is **attached herewith as Annexure B&C.**

The house approved the Item:FoodSci& Micro 6: 2021: 7

The meeting ended with vote of thanks by Mrs. SadhnaTandon. She said that all achievements are due to excellent team work and she has full faith in her team for prospective growth of department under Autonomous status. She also thanked all the external members of Board members for their valuable inputs and for sparing their precious time for the meeting.

FACULTY OF SCIENCES

Syllabus

Of

Food Science and Quality Control

For

B.Sc. Medical (Semester I – VI)

(12+3 System of Education)

Session: 2021-22



The Heritage Institution

**KANYA MAHA VIDYALAYA
JALANDHAR
(Autonomous)**

KanyaMahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-I

(SESSION 2021-22)

Bachelor of Science (Medical) Semester I									
Course Code		Course name	Course Type	Marks					Examination time (in Hours)
				Total	Paper	Ext.		CA	
						L	P		
BSMM-1255	I	Food Science and Quality Control (Vocational) (Food chemistry and nutrition)	E	100	Food chemistry and nutrition	60	-	20	3
	P				Practical- Food chemistry and nutrition	-	20		3

KanyaMahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-II

(SESSION 2021-22)

Bachelor of Science (Medical) Semester II									
Course Code		Course name	Course Type	Marks					Examination time (in Hours)
				Total	Paper	Ext.		CA	
						L	P		
BSMM-2255	I	Food Science and Quality Control (Vocational) (Food Plant Hygiene & Sanitation)	E	100	Food Plant Hygiene & Sanitation	60	-	20	3
	P				Practical- Food Plant Hygiene & Sanitation	-	20		3

KanyaMahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-III

(SESSION 2021-22)

Bachelor of Science (Medical) Semester III									
Course Code		Course name	Course Type	Marks					Examination time (in Hours)
				Total	Paper	Ext.		CA	
						L	P		
BSMM-3255	I	Food Science and Quality Control (Vocational) (Food Processing & Packaging)	E	100	Food Processing & Packaging	60	-	20	3
	P				Practical- Food Processing & Packaging	-	20		3

KanyaMahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-IV

(SESSION 2021-22)

Bachelor of Science (Medical) Semester IV									
Course Code		Course name	Course Type	Marks					Examination time (in Hours)
				Total	Paper	Ext.		CA	
						L	P		
BSMM-4255	I	Food Science and Quality Control (Vocational) (Quality Assurance)	E	100	Quality Assurance	60	-	20	3
	P				Practical-Quality Assurance	-	20		3

KanyaMahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-V

(SESSION 2021-22)

Bachelor of Science (Medical) Semester V										
Course Code		Course name	Course Type	Marks					Examination time (in Hours)	
				Total	Paper	Ext.		CA		
						L	P			
BSMM-5255	I	Food Science and Quality Control (Vocational) (Food Analysis)	E	100	Food Analysis	60	-	20	3	
	P				Practical- Food Analysis	-	20		3	

KanyaMahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-VI

(SESSION 2021-22)

Bachelor of Science (Medical) Semester VI									
Course Code		Course name	Course Type	Marks					Examination time (in Hours)
				Total	Paper	Ext.		CA	
						L	P		
BSMM-6255	I	Food Science and Quality Control (Vocational) (Food Plant layout and management)	E	100	Food Plant layout and management	60	-	20	3
	P				Practical- Food Plant layout and management	-	20		3

Bachelor of Science (Medical) Semester-I
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD CHEMISTRY AND NUTRITION
Course Code: BSMM-1255 (I)
(THEORY)

Course Outcomes:

After passing this course the student will be able to:

- **CO1:** Understand food, its functions, food groups, food digestion, absorption, transport and utilization of nutrients in the body.
- **CO2:** Understand nutrition, malnutrition and nutrient requirement for adult men and women as per ICMR.
- **CO3:** Understand the composition and nutritional significance of cereals, milk and milk products, egg, meat, fruits and vegetables.
- **CO4:** Understand the chemistry underlying the properties of various food components.

Bachelor of Science (Medical) Semester-I
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD CHEMISTRY AND NUTRITION
Course Code: BSMM-1255 (I)
(THEORY)

Examination Time: 3 Hrs.

Max. Marks: 100

Theory Marks: 60

Practical Marks: 20

CA: 20

Instructions for the Paper Setter: Eight questions of equal marks (12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT- I

1. **Introduction to nutrition**—food as a source of nutrients, function of foods, definition of nutrition, nutrients, adequate, optimum and good nutrition, malnutrition.
2. **Inter-relationship between nutrition and health**—parameters of good health.
3. **Food guide**—basic five food groups – Importance, uses.
4. **Food Metabolism** —digestion, absorption, transport, utilization of nutrients in the body.
5. **Recommended dietary Requirements**- Nutrient requirement for adult men and women as per ICMR.
6. **Water**—function, sources, requirement, water balance, effect of deficiency on health.

UNIT-II

7. **Carbohydrate**—composition, classification, food sources, storage in body, reaction, structure, functions of mono, oligo and poly-saccharides in foods.
8. **Fat and oils**—composition, saturated, unsaturated fatty acids, food sources, functions of fats. Nomenclature and classification, emulsions and emulsifiers, role of fat and oil in food processing.
9. **Proteins** — composition, essential and non-essential amino acids, sources of protein, functions, protein deficiency diseases, physico-chemical properties, modification of food protein during processing and storage.
10. **Energy** —unit of energy, food as a source of energy, calorific value of food, need for energy, basic metabolic role, utilization of fat, energy requirement.
11. **Minerals**- function, sources, bio-availability and deficiency of macro and micro minerals.
12. **Vitamins**- classification, sources, functions and deficiency diseases of fat and water soluble vitamins.

UNIT- III

13. **Cereals:** Composition and Nutritional aspects, breakfast cereals and cereal products: Bread and pasta.

14. Milk and Milk Products: Composition, classification, storage, uses, and nutritional significance of milk, curd, butter, paneer, khoa, cheese, ice-cream and various kinds of processed milk.

UNIT -IV

15. Egg and Poultry: Composition and nutrition significance.

16. Meat and Fish: Structure, composition and nutritional significance, post mortem changes, changes in meat during cooking.

17. Fruits and Vegetables: Nutritive value of fruit and vegetables and their products- jam, jelly, marmalade and canned products.

Books Recommended:

1. Food Chemistry, 2007, 4th Edition, Owen R. Fennema. **(Online available)**
2. Food Chemistry, 2003, 2nd Edition, Connie M. Weaver, James R. Daniel.
3. Food Chemistry, 1974, 3rd Edition, Mian Hoagland Meyer.
4. Principles of Food Chemistry, 2018, 4th Edition, deMan.
5. Basic Food Chemistry, 2012, 4th Edition, Frank A. Lee.
6. Fundamentals of Foods and Nutritions, 2018, 6th Edition, Mudambi S.R., M.V. Rajgopal.
7. Advanced text book of Foods Nutrition, 1985, 2nd Edition, Swaminathan S.
8. Dairy technology: principles of milk properties and processes, 1995, 1st Edition, P. Walstra, T.J Guerts, A. Noomen, A. Jellema and M.A.J.S Van Boekel.
9. Cereal processing technology, 2001, 1st Edition, Gavin Owens.
10. Preservation of Fruit and Vegetables, Girdhari Lal, G.S. Siddappa and G.L. Tandon, ICAR, New Delhi.
11. Analysis and Quality Control for Fruit and Vegetable Products, S Ranganna, McGraw Hill Education (India) Private Limited, Chennai, India.
12. Essentials of Food Science, 2013, 4th Edition, Vickie A. Vaclavik, Elizabeth W. Christian. **(Online available)**
13. Food Chemistry, 2009, 4th Edition, H.-D. Belitz, W. Grosch, P. Schieberle. **(Online available)**

Bachelor of Science (Medical) Semester-I
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: PRACTICAL – (Related to Food Chemistry and Nutrition)
Course Code: BSMM-1255 (P)
(PRACTICAL)

Time: 3 Hrs.

Max. Marks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

List of Practicals

1. Determination of moisture content of wheat flour.
2. Calculation of BMI and BMR
3. Determination of ash content of food sample.
4. Qualitative tests of proteins and lipids in different foods.
5. Estimation of Vitamin C.
6. Determination of salt content in food products.
7. Estimation of volatile and nonvolatile acids in vinegar.
8. Estimation of fat in food sample by Soxhlet apparatus.
9. Grading and quality evaluation of eggs.
10. Dehydration of common fruits and vegetables.

Bachelor of Science (Medical) Semester–II
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD PLANT HYGIENE AND SANITATION
Course Code: BSMM-2255 (I)
(THEORY)

Course Outcomes: After passing this course the student will be able to:

- **CO1:** Understand hygiene, sanitation and importance of personal hygiene of food handler in food industries.
- **CO2:** Learn various methods, basic principles and practices of cleaning and sanitation in food processing industries.
- **CO3:** Understand requirements of waste management, waste disposal and treatment in food industries
- **CO4:** Understand requirements of water utilization and hygiene of water used for processing.

Bachelor of Science (Medical) Semester–II
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD PLANT HYGIENE AND SANITATION
Course Code: BSMM-2255 (I)
(THEORY)

Examination Time: 3 Hrs.

Max. Marks: 100

Theory Marks: 60

Practical Marks: 20

CA: 20

Instructions for the Paper Setter: Eight questions of equal marks(12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT - I

Importance of personal hygiene of food handler- habits, clothes, illness, education of handler in handling and service. Cleaning agents and disinfectants. Uses of different cleaning and sanitizing agents, GLP, GHP, CIP and COP.

UNIT - II

Cleaning methods– sterilization, disinfection, heat & chemicals, chemical tests for sanitizer strength.

UNIT - III

Food sanitation- principles & methods, control and inspection, sanitation in fruits & vegetables industry, cereals industry, dairy industry, meat, egg & poultry units.

UNIT - IV

Control of infestation, rodent control, vector control, use of pesticides, hygiene of water used for processing, Analysis of total plate count and *E.coli*, planning & implementation of training programmes for health personnel, waste disposal and treatment.

Books Recommended:

1. Principles of Food Sanitation by Norman G. Marriott
2. Food Poisoning and Food Hygiene by Hobbs, B. C. and R. J. Gilbert
3. Quantity food sanitation by Longree K
4. Environmental Sanitation in India by Kawata K

Bachelor of Science (Medical) Semester–II
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: PRACTICAL – (Related to Food Plant Hygiene and Sanitation)
Course Code: BSMM-2255 (P)
(PRACTICAL)

Time: 3 Hrs.

Max. Marks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

List of Practicals:

1. Sterilization of equipments used in the laboratory by using heat and chemicals.
2. Determination of B.O.D& C.O.D
3. Determination of sanitary status of plant equipment.
4. Chlorination of water.
5. To study the bacteriology of water.
6. Determination of Total dissolved solids (TDS) of water.
7. Determination of Hardness of water.
8. Determination of alkalinity and acidity of water.
9. Determination of organic matter of water.
10. Determination of chlorides and sulphates in water.

Bachelor of Science (Medical) Semester–III
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD PROCESSING AND PACKAGING
Course Code: BSMM-3255 (I)
(THEORY)

Course Outcomes:

After passing this course the student will be able to:

- **CO1:** Understand the reasons of spoilage and basic principles of food preservation methods.
- **CO2:** Understand different types of packaging materials, their properties and packaging machinery used in packaging of food.
- **CO3:** Understand processing of fats, oils, sugar, salt, tea, coffee, chocolate and cocoa powder, spices and flavor and extruded foods.
- **CO4:** Learn manufacturing of fermented products: wine, vinegar, beer, fermented milks, yoghurt, etc.

Bachelor of Science (Medical) Semester–III
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD PROCESSING AND PACKAGING
Course Code: BSMM-3255 (I)
(THEORY)

Time: 3 Hrs.

Max. Marks: 100
Theory Marks: 60
Practical Marks: 20
CA: 20

Instructions for the Paper Setter: Eight questions of equal marks (12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT-I

1. Physical principles underlying food processing operations including thermal processing, ionizing radiation, refrigeration, freezing, dehydration.
2. Chemical preservation in food processing.
3. Fats and Oils: Types and sources of fats and oils (animal and vegetable), processing, uses, storage and nutritional aspects.
4. Sugar and Sugar Products: Different forms of sugar (sugar, jaggery, honey syrup), manufacture, selection, storage and use.

UNIT-II

5. Salt: preparation of brine and pickling.
6. Processing of: Tea, coffee, chocolate and cocoa powder.
7. Extruded foods.
8. Enzymes: Definition, factors affecting enzyme activity, role of enzymes in food processing.

UNIT-III

9. Fermentation technology, manufacturing of fermented products: Wine, vinegar, beer, yoghurt, etc.
10. Spices and flavors.
11. Food additives, classes of food additives, role in food processing.

UNIT-IV

12. Definition and functions of Packaging
13. Types of packaging materials: metal, glass, wood, paper and plastics and their importance.
14. Types of packages and their evaluation: bottle, pouch, tetra-pack and cans.
15. Packaging machinery
16. Shelf life testing.

Books Recommended

1. Post Harvest Technology of Cereals, Pulses and Oilseeds, 2019, 3rd Edition, Amalendu Chakraverty.
2. Technology of Cereals, 1994, 4th Edition, Norman Leslie Kent and A.D. Evers.
3. Preservation of Fruits & Vegetables, 2009, Girdhari Lal, G.S Siddappa and G.L Tandon.
4. Principles of Food Packaging, 1980, 2nd Edition, Stanley Sacharow and Roger C. Griffin.
5. Chemistry of food additives and preservatives, 2012, 1st Edition, Titus A.M. Msagati.
6. Food Preservation, 2nd Edition, M. Shafiur Rahman. **(Online available)**
7. Food Packaging – Principles and practice, 3rd Edition, 2012, Gordon L. Robertson. **(Online available)**

FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: PRACTICAL (Related to Food Processing and Packaging)
Course Code: BSMM-3255 (P)
(PRACTICAL)

Time: 3 Hrs.

Max. Marks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

List of Practicals:

1. Determination of physical characteristics of cereals.
2. Milling of wheat into flour.
3. Determination of wet and dry gluten contents.
4. Identification of packaging materials.
5. To estimate the shelf life of packaged food.
6. To determine the strength of different packaging material.
7. To find out the tin coating weight.
8. To find out the uniformity and amount of wax on wax paper.
9. To check the chemical resistance of packaging materials.
10. To check the adequacy of blanching.
11. Visit to various industries dealing with food packaging material like, paper board and metal.

Bachelor of Science (Medical) Semester–IV
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: QUALITY ASSURANCE
Course Code: BSMM-4255 (I)
(THEORY)

Course Outcomes

After passing this course the student will be able to:

- **CO1:** Understand principles and methods of quality control and quality attributes(Colour, texture, size, shape and flavour).
- **CO2:** Understand principles of HACCP and GMP.
- **CO3:** Understand the principles of sensory evaluation, sampling.
- **CO4:** Learn food laws and regulations (FSSAI, PFA, AGMARK, FPO, MFPO, BIS, ISO)

Bachelor of Science (Medical) Semester-IV
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: QUALITY ASSURANCE
Course Code: BSMM-4255 (I)
(THEORY)

Examination Time: 3 Hrs.

Max. Marks: 100

Theory Marks: 60

Practical Marks: 20

CA: 20

Instructions for the Paper Setter: Eight questions of equal marks(12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT-I

1. Objectives, importance and functions of quality control
2. Quality attributes
3. Quality control in food industry-methods of evaluation and control of the various aspects of quality of raw materials, manufacturing process and the testing of finished products.

UNIT-II

4. Methods of quality assessment of food materials: fruits, vegetables, cereals, dairy products, meat, egg and processed products.
5. Color: Definition, importance, different color measuring instruments used in food industries.
6. Texture: Definition, importance, different texture analyzing instruments used in food industries to analyze texture.

UNIT-III

7. Sampling, specifications of raw materials and finished products
8. Sensory evaluation.

UNIT-IV

9. Concept of HACCP and GMP.
10. Food Laws and Regulations- FSSAI, AGMARK, FPO, PFA, MFPO, BIS, ISO.

Recommended Books:

1. Quality Control for Food Industry by A. Kramer and B.A. Twigg
2. Handbook of analysis and quality control for fruits and vegetable products by S. Ranganna
3. Food Science by N.N. Potter

Bachelor of Science (Medical) Semester–IV
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: PRACTICAL (Related to Quality Assurance)
Course Code: BSMM-4255 (P)
(PRACTICAL)

Time:3 Hrs.

Max. Marks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE office, Kanya Maha Vidyalaya, Jalandhar.

List of Practicals:

1. Determination of acidity and pH of milk.
2. Platform tests for determining the quality of milk.
3. Determination of cooking quality of rice.
4. Determination of iodine value of oil/fat.
5. Determination of saponification value of oil/fat.
6. Determination of reducing and non-reducing sugars.
7. Determination of interior and exterior quality of eggs.
8. Determination of alcoholic acidity of flour.
9. Adulterants in milk, cereals, oils and fats and their detection.
10. Cut out analysis of canned fruits and vegetable.

Bachelor of Science (Medical) Semester–V
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD ANALYSIS
Course Code: BSMM-5255 (I)
(THEORY)

Course Outcomes:

After passing this course the student will be able to:

- **CO1:** Understand the chemical and biochemical composition & nutritional importance of foods and their importance for health and safety of consumers
- **CO2:** Understand physical characteristics of foods with special reference to rheological behavior and textural characteristics.
- **CO3:** Understand the basics of chromatography techniques to separate and identify various biological molecules with special reference to amino acids, carbohydrates, lipids, nucleic acid, and proteins.
- **CO4:** Understand the importance of legal standard, quality assurance, nutritional value determination and adulterants detection.

Bachelor of Science (Medical) Semester–V
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD ANALYSIS
Course Code: BSMM-5255 (I)
(THEORY)

Examination Time: 3 Hrs.

Max. Marks: 100
Theory Marks: 60
Practical Marks: 20
CA: 20

Instructions for the Paper Setter: Eight questions of equal marks (12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT-I

1. Food composition and factors effecting food composition.
2. Proximate composition analysis of food.

UNIT-II

3. Analysis of Micro nutrients and minerals.

UNIT-III

4. General physical methods of analysis of foods: Refractrometry & polarimetry.
5. Introduction and principles of Food rheology, types of viscosity, equipments used to check the viscosity.

UNIT-IV

6. Basic principles and working of Column chromatography, Gas chromatography and High Pressure Liquid Chromatography

Reference Books:

1. Manuals of Food Quality Control additions contaminants techniques, 1980.
2. The Chemical Analysis of Food and Food Products by Morris B Jacob, 3rd Edition., Roberte, Krieger.
(Online available)
3. Food Analysis, 2019, 5th Edition, S. Suzanne Nielsen. **(Online available)**
4. Analysis and Quality Control for Fruit and Vegetable Products, S Ranganna, McGraw Hill Education (India) Private Limited, Chennai, India.

Bachelor of Science (Medical) Semester–V
Session 2021-22
FOOD SCIENCE AND QUALITY CONTROL (VOCATIONAL)
Course Title: PRACTICAL (Related to Food Analysis)
Course Code: BSMM-5255 (P)
(PRACTICAL)

Max. Marks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, KanyaMahaVidyalaya, Jalandhar.

List of Practicals:

1. Determination of milk quality by lactometer
2. To find out the TSS of food sample by refractrometer.
3. Determination of surface tension of food sample by using drop number method.
4. Determination of viscosity index of food sample.
5. Proximate composition of different types of food.
6. Estimation of different minerals in food.
7. Estimation of vitamins in food.

Bachelor of Science (Medical) Semester–VI
Session 2021-22
FOOD SCIENCE & QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD PLANT LAYOUT AND MANAGEMENT
Course Code: BSMM-6255 (I)
(THEORY)

Course Outcomes:

After passing this course the student will be able to:

- **CO1:** Understand the importance of plant layout and learn how to set up the proper plant layout to reduce the production cost and increase the productivity.
- **CO2:** Learn how market research helps to understand the consumers, their needs and their satisfaction level.
- **CO3:** Understand the societal changes and their impact on food consumption trends.
- **CO4:** Learn about different types of food product and study the different steps involved in the product development.

Bachelor of Science (Medical) Semester–VI
Session 2021-22
FOOD SCIENCE & QUALITY CONTROL (VOCATIONAL)
Course Title: FOOD PLANT LAYOUT AND MANAGEMENT
Course Code: BSMM-6255 (I)
(THEORY)

Examination Time: 3 Hrs.

Max Marks:100
Theory Marks:60
Practical Marks: 20
CA: 20

Instructions for the Paper Setter:

Eight questions of equal marks(12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT-I

Importance of a plant layout selection of site and layouts of different food industries, selection of equipments, machinery and building material, selection and planning of manufacturing process and service facilities, maintenance and replacement, depreciation of machinery, management set up in a plant.

UNIT-II

Market and Consumer Research.Economic, Psychological, Anthropological and Sociological dimensions of food consumption pattern.Food situation in India and outside.

UNIT-III

Needs and types of Food consumption trends. Trends in social change and its role in diet pattern using social trends as a framework in new product innovation. Trapping the unconventional post-harvest losses and prospects of food processing for export.

UNIT –IV

Traditional foods-Status and need for revival in the context of westernized non-traditional foods, urbanization and such factors. Product development: Primary Processing, Secondary Processing, Types of products e.g. Quick cooking, fast foods, fabricated food , convenience foods.

Recommended Books:

1. Principle of Food Sanitation by Marriott, 5th ed., 2006, CBS Publishers, New Delhi.
2. Food Processing Waste Management by Green JH and Kramer A, 1979, AVI Publishers, USA.
3. Food Science by Potter NN, 5th ed., 2006, CBS Publishers, New Delhi.

Bachelor of Science (Medical) Semester–VI
Session 2021-22
FOOD SCIENCE & QUALITY CONTROL (VOCATIONAL)
Course Title: PRACTICAL (Related to Food Plant Layout and Management)
Course Code: BSMM-6255 (P)
(PRACTICAL)

Time:3Hrs.

Max. Marks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar.

List of Practicals:

- 1.** Calculation of depreciation and processing costs.
- 2.** Preparation of layout and Process diagram of potato chips manufacturing plant.
- 3.** Preparation of layout and Process diagram of jam/marmalade manufacturing plant.
- 4.** Preparation of layout and Process diagram of bread making plant.
- 5.** Preparation of layout and Process diagram of dairy industry.
- 6.** Preparation of layout and Process diagram of wine making unit.
- 7.** Preparation of layout and Process diagram of modern slaughter plant.
- 8.** Preparation of layout and Process diagram of confectionary unit.
- 9.** Determination of sanitary status of plant equipment.
- 10.** Visit to various food industries.