THIRUVALLUVAR UNIVERSITY

SERKKADU, VELLORE–632115

M.Sc. FOODS AND NUTRITION

SYLLABUS

FROM THE ACADEMIC YEAR
2023 – 2024

CONTENT:

OUTLINEOFTHECURRICULUMANDTEMPLATEFORCOURSESYLLABUS

INTRODUCTION

Home Science is both multidisciplinary and interdisciplinary in its context encompassingmajor disciplines which includes Foods and Nutrition, Nutrition, Food Service Management &Dietetics, Clinical Nutrition & Dietetics, Food Science Technology and Nutrition and Nutrition &Dietetics with hospitality management, Hospital Administration, Food Service Management andFood Processing. Each area has one or more specific areas of specialization. Each specializationunderHomeScienceoffersawidearrayofcoursesthatpreparesstudentsforemploymentorsettingup an enterprise in a wide range of sectors such as healthcare, childcare, food and hospitality,textiles, home and office interiors. Further, all courses of the programme are designed to improvethe lifestyle of the individual, family and society that could most certainly contribute to the holisticdevelopmentofthecommunity.

The primary objective of this course curriculum was to introduce the fundamental conceptsof nutrition by exploring current nutritional issues of relevance in their lives. Students are preparedforawiderangeofcareersashealtheducators,researchers,personaltrainers,publichealth plannersandmore.Thecoursecurriculumforthisprogrammehasbeenplannedtoimprovetheemployability potential and increase the scope for higher education. This programme facilitatesaction-based research in the various fields with the advantage of nurturing critical and analyticalthinkingthatpavethewayforinnovationandentrepreneurship.

HighlightsoftheRevampedCurriculum

- The curriculum focuses on meeting the demands of the Food industry, Entrepreneurs, Publichealthsector,Hospitalityindustries, HealthcareandSocial welfaresectors.
- Thisstudentcentricprogrammeensuresknowledgeandskill developmentbyprovidinghandsontraining,on-the-jobinternships,projects,labpractices,experientialactivities,exposuretoentrepreneurial skillsandtrainingforcompetitiveexaminations.
- Thecoursecontentiscomparabletoworldclasscurriculum.
- The courses are updated to include recent developments in the field of Home Science-FoodScienceNutritionandDietetics.
- Referencesareupdatedandwebresourcesarecited.
- Eachcourseinthecurriculumcarrieseitherapractical/activityorexperientiallearningcomponenttoensureskilldevelopmentalongwithacquiringknowledgeinthesubject.
- Potentialforemployabilityhasbeenenhancedthroughmandatoryinternships.
- DigitalliteracyandcompetencyisensuredusingICTenabledlearningenvironment.

TANSCHEREGULATIONSONLEARNINGOUTCOMES-BASEDCURRICULUM FRAMEWORKFORPOSTGRADUATEEDUCATION	
Programme	**M.Sc.,FoodsandNutrition**
Programme Code	
Duration	**2yearsforPG**
Programme Outcomes(Pos)	**PO1:ProblemSolvingSkill** ApplyknowledgeofManagementtheoriesandHumanResourcepracticestosolvebusinessproblemsthroughresearchinGlobalcontext. **PO2:DecisionMakingSkill** Fosteranalyticalandcriticalthinkingabilitiesfordata-baseddecision-making. **PO3:EthicalValue** Abilitytoincorporatequality,ethicalandlegalvalue-basedperspectivestoallorganizationalactivities. **PO4:CommunicationSkill** Abilitytodevelopcommunication,managerialandinterpersonalskills. **PO5:IndividualandTeamLeadershipSkill** Capabilitytoleadthemselvesandtheteamtoachieveorganizationalgoals. **PO6:EmployabilitySkill** Inculcate contemporary business practices to enhance employability skills in thecompetitiveenvironment. **PO7:EntrepreneurialSkill** Equipwithskillsandcompetenciestobecomeanentrepreneur. **PO8:ContributiontoSociety** Succeedincareerendeavorsandcontributesignificantlytosociety. **PO9:Multiculturalcompetence** Possessknowledgeofthevaluesandbeliefsofmultipleculturesandaglobalperspective. **PO10:Moralandethicalawareness/reasoning** Abilitytoembracemoral/ethicalvaluesinconductingone'slife.
Programme SpecificOutcomes(PSOs)	**PSO1–Placement** Topreparethestudentswhowilldemonstraterespectfulengagementwithothers' ideas, behaviors, beliefs and apply diverse frames of reference todecisionsand actions. **PSO2-Entrepreneur** Tocreateeffectiveentrepreneursbyenhancingtheircriticalthinking,problem

	solving,decisionmakingandleadershipskillthat willfacilitatestartupsandhighpotentialorganizations. **PSO3–ResearchandDevelopment** Design andimplement HRsystems andpractices grounded in researchthatcomply with employment laws, leading the organization towards growth anddevelopment. **PSO4–ContributiontoBusinessWorld** To produce employable, ethical and innovative professionals to sustain in thedynamicbusinessworld. **PSO5–ContributiontotheSociety** Tocontribute to the development of the society by collaborating with stakeholdersformutualbenefit.

TemplateforP.G.,Programmes

Semester–I	Credit	Hours	Semester-II	Credit	Hours	Semester-III	Credit	Hours	Semester–IV	Credit	Hours
Core-I	5	7	Core-IV	5	6	Core-VII	5	6	Core-XI	5	6
Core-II	5	7	Core-V	5	6	Core-VII	5	6	Core-XII	5	6
Core–III	4	6	Core–VI	4	6	Core–IX	5	6	Projectwithvivavoce	7	10
Discipline Centric Elective-I	3	5	Discipline Centric Elective– III	3	3	Core–X	4	6	Elective - VI(Industry / Entrepreneurship) 20%Theory 80%Practical	3	4
GenericElective-II	3	5	GenericElective-IV:	3	3	Discipline CentricElective-V	3	3	SkillEnhancementcourse/ProfessionalCompetency Skill	2	4
			SECI	2	4	SECII	2	3	Extension Activity	1	
			Human Rights	2	2	Internship/ Industrial Activity	2	-			
			MOOC Course	2	-						
	20	**30**		**26**	**30**		**26**	**30**		**23**	**30**
TotalCreditPoints -95											

Choice Based Credit System (CBCS), Learning Outcomes Based Curriculum Framework(LOCF) Guideline Based Credits and Hours Distribution System for all Post–GraduateCoursesincludingLabHours

FirstYear–Semester–I

Part	ListofCourses	Credits	No.ofHours
	Core–I	5	7
	Core–II	5	7
	Core–III	4	6
	Elective–I	3	5
	Elective–II	3	5
		20	**30**

Semester-II

Part	ListofCourses	Credits	No.ofHours
	Core–IV	5	6
	Core–V	5	6
	Core–VI	4	6
	Elective–III	3	3
	Elective–IV	3	3
	SkillEnhancementCourse[SEC]-I	2	4
	HumanRights	2	2
	MOOCCourse	2	-
		26	**30**

SecondYear–Semester–III

Part	ListofCourses	Credits	No.ofHours
	Core–VII	5	6
	Core–VIII	5	6
	Core–IX	5	6
	Core(IndustryModule)–X	4	6
	Elective–V	3	3
	SkillEnhancementCourse-II	2	3
	Internship/IndustrialActivity[Credits]	2	-
		26	**30**

Semester-IV

Part	ListofCourses	Credits	No.ofHours
	Core–XI	5	6
	Core–XII	5	6
	ProjectwithVIVAVOCE	7	10
	Elective–VI(IndustryEntrepreneurship)	3	4
	SkillEnhancementCourse–III/ProfessionalCompetencySkill	2	4
	ExtensionActivity	1	-
		23	**30**

Total95CreditsforPGCourses

M.Sc.,FOODSANDNUTRITION

SEMESTER–I

CourseStatus	CourseTitle	Credits	Hours
Core-I	AdvancedFoodScience	5	7
Core-II	AdvancedHumanPhysiology	5	7
Core -III	Macronutrients	4	6
Elective-I	AdvancedFoodSciencePractical	3	5
Elective-II	FoodProcessingandTechnology	3	5
	TOTAL	**20**	**30**

SEMESTER–II

CourseStatus	CourseTitle	Credits	Hours
Core-IV	AdvancedDietetics	5	6
Core-V	NutritionalBiochemistry	5	6
Core-VI	AdvancedDietetics-Practical	4	6
Elective-III	ResearchMethodsinnutrition	3	3
Elective-IV	PerspectivesofHomeScience	3	3
SEC-I	FoodPreservation	2	4
	HumanRights	2	2
	MOOCCourse	2	-
	Total	**26**	**30**

SEMESTER–III

CourseStatus	CourseTitle	Credits	Hours
Core-VII	Micronutrients	5	6
Core-VIII	PerformanceNutrition	5	6
Core-IX	TechniquesinFoodAnalysisPractical	5	6
Core(IndustryModule)–X	FoodProductDevelopment	4	6
Elective-V	FoodMicrobiology	3	3
SEC–II	DietCounseling and TechniquesinNutritionalAssessment	2	3
	Internship/IndustrialActivity	2	-
	Total	**26**	**30**

SEMESTER–IV

CourseStatus	CourseTitle	Credits	Hours
Core-XI	PublicHealthNutrition	5	6
Core-XII	AdvancedFoodServiceManagement	5	6
	ProjectWorkwithVivavoce	7	10
Elective-VI	EntrepreneurialDevelopment	3	4
SEC–III	FunctionalFoodsandNutraceuticals	2	4
	ExtensionActivity	1	-
	Total	**23**	**30**

TotalCredits-95

CORE-I

ADVANCEDFOODSCIENCE

CREDIT:5
SEMESTER:I
YEAR:1
HOURSPERWEEK:15

Courseobjectives:

- Toenablethestudentsgainknowledgeonthesourceandpropertiesoffood.
- Familiarizestudents withchanges occurringinvariousfoodstuffs asaresultofprocessingandcooking.
- Enablestudentstousetheoreticalknowledgeinvariousapplicationsandfoodpreparations.

COURSEOUTCOME:

Onsuccessfulcompletionofthe course,thestudentswillbeableto

CONo.	**COStatement**
CO1	Overview the relationship between the chemical structure and the propertiesofthemaincomponentsinfoodlikestarch,proteinandlipids.
CO2	UnderstandtheCompositionandcharacteristicsofvariousfoodcommodities.
CO3	Explainthecookingqualityoffoodsandapplyfoodscience knowledgeinfoodindustries
CO4	Identifyandunderstandthenutrientsandfunctionsoffoodsinmaintaininghealth
CO5	Analyzetheproperuseoffoodcolorsandfoodadditivesinsafefoodpreparation.

UNIT-I

- **Properties of food** - Food nutrients, solids, solutions and colloids, Solutions- Physicalproperties of solutions, classification of foods based on viscosity characteristics. Solutes-chemical properties, Food dispersion: Colloids- Types of colloid and properties of colloidsand rheology of food dispersions; Structure, formation and stability of gels, sols, emulsionand foams.

- **Starch** - Sources, Structure and composition of starch; Properties and characteristics offood starches; Modified food starches-Structure and composition, Effect of heat on foodstarchproperties,glutenformationinwheatflour,influencingfactors[gluten],gelatinization, gelationandretrogradation,dextrinizationandfactorsaffectinggelatinization.

UNIT-II

- **Proteins**- Structure andcomposition, Classification and propertiesof proteins; Effect of heaton physio-chemical properties of proteins; Role of proteins in food products; Texturizedvegetableprotein,proteinconcentrates.
- **Enzymes -** Classification and its nature; Mechanism of action; Factors influencing enzymeactivity; Role of enzymes in food products; Immobilized enzymes and its application in foodindustries.

UNIT-III

- **Fatsandoil**-Structure,compositionandpropertiesoffatsandoil;storageoffat,characteristics [shortening, plasticity, flavor, retention of moisture, melting point, opticalactivity, color, specific gravity], Hydrogenation, winterization, flavor reversion, smokingpoint, Rancidity-Types, Mechanism and prevention; Role of fat/oil in food products; Fatsubstitutes.

- **Sugarandsugarproducts-**Typesofsugar,Physicalandchemicalproperties,Sugarproducts - Types of honey, Jaggery, corn syrup, various forms of sugar used in cookery andCrystallizationofsugar.

UNIT-IV

- **Milkcomponents-**water,carbohydrate,milkfat,milkprotein,mineralsandothercomponents in milk, Physiochemical properties of milk, Effect of physical and chemicalfactors on milk components [Effect of heat, protein, factors affecting coagulation, caseincoagulation,minerals, Non-enzymatic browning], [Effects of acid], Effects of enzymes-renin,fermentedand non-fermentedmilkproducts

- **Egg -** Structure, composition and nutritive value; Quality check- grading and deterioration,functionalproperties- foaming,factors affectingfoamformation.Effectof heaton eggprotein.Utilization ofegg industrywastes

UNIT-V

- **Food additives** - Definition, Classification and need for food additives. Flavour compoundsin vegetables, fruits and spices; Effect of processing on food colours and flavours; Role ofcoloursand flavoursinfood products.
- **Sweeteners -** Properties, Artificial and Natural sweeteners and role of sweeteners in foodindustry.

TEXTBOOKS:

- SrilakshmiB.(2015).FoodScience.NewAgeInternational(P)Ltd.Publishers.
- S.M.Reddy(2015).BasicFoodscienceandtechnology.NewAgeInternationalpublishers.AvantinaSharma (2017).Text bookoffood science and Technology. CBSPublisheresand distributesltd.3rdEdition.
- SwaminathanA.(2018).HandbookofFoodand Nutrition,Bangalorepress.
- SerpilSahinandServetGulumSumnu.(2006).PhysicalpropertiesofFoods.Springerpublications.

REFERENCES:

1. GerardL.Hasenhuettl,RichardW.Hartel.(2019).FoodEmulsifiersandTheirApplications.Springerpublications.3rdedition.
2. Vickie.A.Vaclavik.(2021).EssentialsofFoodscience.Springerpublications.5thedition.
3. Dr.M.Swaminathan.(2015). AdvancedtextbookofFoodandNutrition.Volume-2.BapcoPublications.
4. Eskein.(2012).BiochemistryofFood.ElsevierPublications.
5. LynObrienNabors.(2001).AlternativeSweeteners.TaylorandFrancisPublications.
6. JanetD.WardandLarryWard.(2006).Principles ofFoodScience.StemPublishers.4thEdition.

E-LEARNINGRESOURCES:

- www.fao.orgwww.wfp.org
- www.foodrisk.org.
- http://www.fsis.usda.gov/
- https://www.fda.gov/food

MappingCOwithPSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	3	2
CO2	3	3	3	2	1	2
CO3	3	3	3	3	3	2
CO4	2	3	3	2	1	3
CO5	3	3	3	2	2	3
Average	2.8	3	2.8	2.2	2	2.4

PEDAGOGY:

Lecture,Casestudy,journalreviewing,Assignments,Groupdiscussion,Powerpointpresentation

CORE–II

ADVANCEDHUMANPHYSIOLOGY

CREDITS:
5SEMESTER:IYEAR
:I
HOURSPERWEEK:15

Courseobjectives:

Thiscoursewillenablestudentsto:

- Advance their understanding of some of the relevant issues and topics of humanphysiology.
- Enable the students to understand the integrated function of the system Understandalterations of structure andfunction invarious organs andsystems indiseaseconditions**.**

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentwillbeableto-

CONo.	COSTATEMENT
CO1	Developinsightofnormalfunctioningofalltheorgansystemsofthebodyandtheirinteraction.Understandthecurrentstateofknowledgeaboutthefunctional organizationofHumancellandhistology.
CO2	UnderstandthestructuralandfunctionalorganizationofBloodandCardiac System
CO3	UnderstandthestructuralandfunctionalorganizationofRespiration,Immunityand EndocrineSystem
CO4	ComprehendthestructuralandfunctionalorganizationofGIT,Digestive SystemandReproductiveSystem
CO5	UnderstandthestructuralandfunctionalorganizationofSkin,Nervousand Excretorysystem

UNIT–I:CELLANDTISSUE

Cell

- StructureandFunction.Transportationacrosscellmembrane.CelltheoryandCycle.DifferencebetweenMeioticandMitoticcell.Stemcells-typesandfunctions.

Tissue

- Structure,TypesandFunction.

UNIT–II:BLOODANDHEARTCIRCULATORYSYSTEM

Blood

- CompositionandFunctions,BloodGroup–ABOSystemandRhfactor.BloodCoagulation-ProcessandFactorsaffecting.

HeartCirculatorySystem

- StructureandFunctionofHeartandBloodVessels.SystemicandPulmonarycirculation
- CardiaccycleandConduction.HeartrateandCardiacoutput,ECG.Bloodpressureandtheirregulations.

UNIT–III:RESPIRATORYSYSTEMANDENDOCRINESYSTEM

RespiratorySystem

- Structureandfunction.
- GasLawspertainingtoGasExchange(Meaningonly)-Henry'sLawofPartialPressure, Boyle - Mariotte's Law of Volume and Pressure, Dalton's Law of PartialPressure, Charles'sLawofIdealGasEquationandFick'sLawofDiffusion.
- Mechanismofrespiration.
- CirculationandExchangeofrespiratorygases.InternalandExternalRespiration.Chloridesh ift.
- DefinitionsofLungvolumesandLungcapacities
- VentilationandArtificialRespiration.

Immunity

- DefinitionandtypesInnateand Acquireimmunity.

EndocrineSystem

- Hormonesanditstype.
- SyndromesresultingfromhypoandhyperactivityofPituitary,Thyroid,AdrenalsandPancreas.

UNIT–IV:GASTROINTESTINALSYSTEMANDREPRODUCTIVESYSTEM

GastrointestinalSystem

- StructureandfunctionofGItractanditsaccessoryorgans.
- DigestionandabsorptionofCarbohydrates,ProteinsandFats.

ReproductiveSystem

- RoleofhormonesinreproductionandlactatIon.
- MenstrualCycleandMenopause.
- Invitro(IV)fertilization
- Spermatogenesis.

UNIT–V:NERVOUSSYSTEMANDEXCRETORYSYSTEM

NervousSystem

- StructureandFunctionofNeuron.AfferentandEfferentNerves.
- ConductionofNerveImpulse-Synapses,Neurotransmitters,SummationandActionPotential.
- SympatheticandParasympatheticnervousSystem.
- Cerebrospinalfluid(CSF)–compositionandfunction.
- Blood-brainbarrier(BBB).
- Electroencephalogram(EEG)

ExcretorySystems

Renalsystem

- OrgansintheUrinarySystem.
- StructureandfunctionsofNephron.
- JuxtaglomerularCell.
- Mechanismofformationofurine,
- RoleofkidneytoregulateBloodpressure,Water,ElectrolytesandAcidBaseBalance.

Skin

- Structureandfunction**.**
- Regulationoftemperatureofthebody.

TEXTBOOKS

- K. Sembulingam&PremaSembulingam (2019), Essentials of Medical Physiology.Jaypeepublications.8th edition.
- WaughA,RossandWilson(2018).AnatomyandPhysiologyinHealthand Illness.Elsevierpublications.13th edition.
- CCChatterjee(2020).HumanPhysiology.CBSpublishers.13th edition.
- InduKhurana(2020).MedicalPhysiologyforUndergraduateStudents.ElsevierPublication.2nd edition.
- GKPal(2019).Textbookofhumanphysiology,Elsevierpublications.3rd edition.
- Guyton,A.G.andHall,J.B.(2005):TextBookofMedicalPhysiology.W.B.SandersCompany,PrismBooks(Pvt.)Ltd.,Bangalore.9th edition.
- Wilson,K.J.WandWaugh,A.(2003):RossandWilsonAnatomyandPhysiologyinHeathandIllness.ChurchillLivingstone.8th edition.
- Jain,A.K.:TextbookofPhysiology. AvichalPublishingCo.,NewDelhi.Vol.IandII.
- McArdle,W.D.,Katch,F.I.andKatchV.L(2001):ExercisePhysiology.Energy,NutritionandHumanPerformance.WilliamsandWilkins,Baltimore.4thEdition.
- Ganong,W.F.(1985):ReviewofMedicalPhysiology.langeMedicalPublication.,12th edition.
- Moran Campell E.J.,Dickinson, C.J.,Slater,J.D., Edwards. C.R.W. andSikora,K.(1984):ClinicalPhysiology.ELBS,BlackwellScientificPublications.,5th edition.

- Winword.Sear'sAnatomyandPhysiologyfornurses.London,EdwardArnell.
- ChatterjeeChandiCharan:TextBookofMedicalPhysiology,LondonW.B.

E-LEARNINGSOURCES

- **https://youtu.be/MZDy0RvA52Y-Osmosis**
- **https://youtu.be/TgcyiVQnVBs-Respiratory system**
- **https://youtu.be/44B0ms3XPKU-nervoussystem**

Mapping:(CO/PSO)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	3	3	2	3
CO2	3	1	3	3	2	3
CO3	3	1	3	3	2	3
CO4	3	1	3	3	2	3
CO5	3	1	3	3	2	3

PEDAGOGY

Lecture,PowerPointPresentation,Demonstration,GroupDiscussion,Assignment,LibraryVisits,Seminarsand Oral&WrittenRevision

CORE:
IIIMACRONUTRIENTS

CREDITS:
4SEMESTER:IYEA
R:1
HOURSPERWEEK15

Courseobjective:

Toenablethe students

- Tounderstandtherelationshipbetweenlipid,carbohydrate,proteinandmineralmetabolism.
- Tolearnaboutthetherapeuticusesofcarbohydratesproteinandfatinpreventionofnon-communicabledisease.
- Togetinsightsintheinbornerrorsofmetabolism

COURSEOUTCOMES:

Onsuccessfulcompletionofthecoursethestudentwillbeableto-

CONo.	COSTATEMENT
CO1	Understandtheessentialsofnutrientsingrowthanddevelopmentofhumans
CO2	Appreciate the importance of major nutrients in maintaining human health andleadingactivelifestyle
CO3	Planforenhancementofnutritionalqualityofthediet.
CO4	Identifythevarioustypes&sourcesoffoodborneillnessandmethodsofprevention.
CO5	Evaluatetheroleofnutrientsinhealthanddiseases.

UNIT-I:

ENERGY- Energy content of foods, physiological fuel value, Estimation of total energyrequirements (BMR, REE and physical cost of activities) TEE, Basal metabolic rate, totalenergy requirements, BMR& RMR, Factors affecting BMR, Thermic effect of food.Changesinbodyweightandbodycompositionwiththechangingenergybalance,Regulationoffoodintake- roleofhungerandsatietycenters.Energy balance andobesity.

UNIT-II:

CARBOHYDRATES–Classification,Therapeuticusesofcarbohydrates, sugarsin

parenteralnutrition.Glycemicindexoffoodsanditsuses.Toxiceffectsoffructose,xylitoland galactose.Sugar alternatives, Role of dietary fiber in health and disease.Role ofcarbohydratesin healthand disease

UNIT-III:

PROTEIN – Historical review of protein metabolism, Amino acid patterns in protein ofanimals and vegetable origin, critical study of methods of assessment of protein quality.Physiologicalfunctions ofproteins.EssentialAminoAcids,amino acid balanceandimbalance, Role of protein in health and disease.Supplementation of individual aminoacid.

UNIT-IV:

LIPIDS– Concepts of visible and invisible fats, EFA, SFA, MUFA, PUFA, omega–6 toomega–3 ratios. – sources and physiological functions and their role in health and disease.Adipose tissue – Lipogenesis and Lipolysis, lipoproteins – types and health implication.Storage of body fat, Effects of deficiency. Fat substitutes, Hypocholesterolaemic foods –garlic,fiberandplantproteins.

UNIT-V:

WATER – Sources, Function, Requirement,Distribution of water in the body, Factorsinfluencing distribution of body fluid. Exchange of water in the body. Water imbalance –dehydration- waterintoxication,waterandelectrolytemechanism–roleofADH

TEXTBOOKS:

- Satyanarayana,U.,&Chakrapani,U.(2013).Biochemistry,BookandAlliedPvt.*Ltd.,Kolkata*.
- Wardlaw,G.M.,Byrd-Bredbenner,C.,Moe,G.,Berning,J.R.,&Kelley, D. S.(2013).*Wardlaw'sperspectivesin nutrition*.McGraw-Hill.
- Williams,S.R.(2004).Nutritionanddiettherapy.*Nutritionanddiettherapy.*
- Sizer, F., Whitney, E., & Webb, F. (2003). Nutrition Concepts and Controversy, ThomasWadsworth,Australia.9th edition.
- Shils, M. E., Olson, J. A., &Shike, M. (2000). Modern nutrition in health and disease.Modern Nutrition in Health and Disease .Vol I and II. Lea &Febiger Philadelphia, AWaverlyCompany.Eighth edition.
- Mahan, L.K., & Stump, S.E. (2002). Krause's Food Nutrition and Diet Therapy. W.B.Saunder'scompany,Philadelphia.10th edition.
- Guthire,H.A., (2001). IntroductoryNutrition.C.V.MosbyCompany, St.Louis. Tenthedition.
- Bogert,J.G.V.,Briggs,D.H.,&Calloway,(2000).Nutritionandphysicalfitness.W.B.Saunders Co.,Philadelphia,London,Toronto.11th edition.
- Brown,J.E., (2002). Nutrition Now. Wadsworth ThomsonLearning New York. 3rd edition.
- Toteja,G.S.(2004).*MicronutrientprofileofIndianpopulation*.IndianCouncilofMedicalResearchPublication,NewDelhi.
- Swaminathan,M.,(2002).PrinciplesofNutritionandDietetics.BAPPCO,88,Mysore

Road.Bangalore–560018.
- Jain,J.L.,Jain,S.,&Jain,N.,(2005).FundamentalsofBiochemistry.S.CHAND&COMPANY Ltd.Ramnagar,NewDelhi-110055.6th revisededition.

E-LEARNINGRESOURCES:

www.nutrition.gov–
ServiceofNationalagriculturallibrary,USDAwww.nal.usdfa.gov/fnic-
Food and nutrition information centerwww.fantaproject.org-
Fantatechnicalassistancefornutrition
http://dietary-supplements.info.nih.gov–Officerofdietarysupplements,nationalinstituteofhealth.

MAPPING(CO/PSO):

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	2	2	3	3	3	3
CO5	2	2	2	3	3	2
Average	**2.6**	**2.6**	**2.8**	**3**	**3**	**2.8**

PEDAGOGY:

Lecture,JournalReviewing,Powerpointpresentations,AssignmentsandDiscussions

ELECTIVE-I
ADVANCEDFOODSCIENCEPRACTICAL

CREDIT:
3SEMESTER:IYE
AR:1
HOURSPER WEEK:10

COURSEOBJECTIVES:
Toenablethe students

- Comprehendtheknowledgegainedoncharacteristicsandpropertiesoffoodsduringcooking
- Applythepropertiesoffoodinvariousfoodprocessingandpreparations Analysethefactorsaffecting cooking qualityoffoods
- Createappropriatefoodpreparationandprocessingmethodstoensurequalitystandards.

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentswillbeableto

CONo.	COStatement
CO1	Gainknowledgeonsensoryanalysisandcerealcookeryconcept
CO2	Understandthepropertiesofvariousfoods.
CO3	Analyzethecookingqualityoffoodsandapplyknowledgeinfoodindustries.
CO4	Identifyandunderstandthephysicalcharacteristicsoffood.
CO5	Revise appropriate food preparation andprocessingmethodstoensurestandardsin foodindustry.

UNIT-I

Sensorymethod–

1. Analysisoftastesensitivity-Thresholdtest.Duo–Triotest

2.Multiplesampledifference

Starch-

1. Microscopicstructureandgelatinization.

2. Factorsaffectinggelatinization–sagtest.

3. Glutenformation

UNIT-II

Pulses:Factorsaffectingcookingquality

Fruit:

1. Enzymaticbrowning,Pectintest
2. Firmnessofgel

UNIT-III

Vegetable:

1.Variousmethodofcookingfatsolubleandwater-solublepigment.

Milk:

i. 1.Detectingthepresenceofstarch,soda,ureainmilk sample.pHofmilk sample.
ii. 2.Effectofacidonmilk.Maillardreaction.

UNIT-IV

Sugar:

1. Relative sweetness of sugar- sucrose, maltose, lactose, fructose, dextrose, glucose,artificialsweeteners
2. Stagesofsugarcookery
3. Effectofdextrose,jaggery,honeyandcreamoftartaronsucrose.

Fatsandoils:

2. Smokingpoint– Groundnutoil,coconutoil,Gingellyoil,Oliveoil,Vanaspati,Ghee,RefinedSunfloweroil,Ricebranoil.
3. Cookingtemperatureandfatabsorption-– Groundnutoil,coconutoil,Gingellyoil,RefinedSunfloweroil,Ricebran oil.

UNIT-V

1. Physicalpropertiesofcerealsandprocessedproducts
    - Thousandgrainweight
    - Thousandgrainvolume
    - Hydrationcapacity
    - Hydrationindex
    - Swellingcapacity
    - Specificgravity
    - Seeddisplacementtest
    - Viscosity-Linespreadtest,Viscometer.

2.Adulterationtestformilkandmilkproducts,honey,wholeandpowderedspices,tea,coffee,Vegetableoils,saffronandsilverleaves

TEXTBOOKS:

- SrilakshmiB.(2015).FoodScience,NewAgeInternational(P)Ltd.Publishers.
- PotterN.andHotchkissJ.H.(1996).FoodScience,Fifthed.,CBSPublishersandDistributors,NewDelhi

- Avantinasharma(2017).TextbookoffoodscienceandTechnology.CBSPublisheresand distributesltd.3rdEdition.
- ReddySM.(2015).BasicFoodscienceandtechnology.NewAgeInternationalpublishers.2ND edition.

REFERENCES:

- SwaminathanA(1979).FoodScienceAndExperimentalFoods,GaneshAndCompany Madras.3rd edition.
- Bennion,MarionandO.Hughes(2001).IntroductoryFoods.Edi:MacMillianN. Y.1st edition.
- Eskein.(2012).BiochemistryofFood.Elsevierpublications
- Desrosier,N.W.andJamesN.(2007).Technologyoffoodpreservation.AVIPublishers.
- Manay,S.andShadaksharamasamy,(2004).Food:FactsandPrinciples,NewAgeInternationalPublishers,NewDelhi.1st edition.

E-LEARNINGRESOURCES

- http://www.fao.org/3/V5030E/V5030E00.htmhttps://fmtmagazine.in/fruits-vegetables-processing-technologies/
- www.fao.orgwww.wfp.org
- LearnMicrobiologywithOnlineCoursesandClasses|edX

MappingofCOwithPSO:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	2	3	3	2
CO2	3	3	3	2	3	3
CO3	3	2	3	3	3	3
CO4	3	3	3	2	2	3
CO5	3	3	2	3	3	2
Average	3	2.8	2.6	2.8	2.8	2.6

PEDAGOGY

Experiments,Planningrecipes,GroupDiscussion,Assignments,.

ELECTIVEGENERIC/DISCIPLINECENTRIC-

IIFOODPROCESSINGANDTECHNOLOGY

CREDIT:3
SEMESTER: I
YEAR:1
HOURSPERWEEK:10

COURSEOBJECTIVES:

Toenablethestudents:

1. Understandthesciencebehindprocessingoffoodsanditsimpactonnutritivevalueoffood stuffs.
2. Acquirein-depthknowledgeonproductionofprocessedfoodproductsandthewasteutilizationtechniques.
3. Understandthechangesinphysicochemicalpropertiesoffoodsduetoprocessingcondition.
4. Understand the various parameters related to post-harvesttechnology.

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentswillbeableto

CONo.	COStatement
CO1	Understandtheconceptsandprinciplesoffoodprocessing.
CO2	T\Identifythevariousprocessedfoodproductsfromplantand animalsources.
CO3	Plantheby-productsutilizationfromfoodprocessing.
CO4	Makeuseofthesystematicknowledgeofbasicandapplied aspectsinfoodprocessingandtechnology.
CO5	Applythe various post-harvest technologiesfor differentfoodproducts

UNIT-I

- **Processingoffoods:**Primary,secondaryandtertiaryprocessing,historicalperspective,traditional technologies used in food processing. Effects of processing on components,propertiesandnutritionalvalueoffoods.
- **Enzymes in Food Processing**: Enzyme- Review of classification, enzyme inhibitors,enzymaticbrowning.

UNIT-II

CerealProcessingandTechnology:

- **Rice:** parboiling, milling and pearling; Processing and milling of wheat, maize, barley,oatsand rye.
- **Millets**:processingofmillets;
- **Cereal Products:** Flours and its quality; Processed products of rice, wheat and maize;Byproductsutilization;breakfastcerealsandextrusion;Effectofprocessingonnutritive value of cereals; changes in physiochemical properties of cereal starch andproteindueto processing.
- **Millingprocess:**Completemillingprocess,breakrolls,reductionrolls,milledproductsandtheirnutritivevalueandapplications

PulseProcessingandTechnology:

Dals, flours, protein concentrates, isolates and hydrolysates; Byproducts utilization;Effectofprocessingonnutritivevalueandphysiochemicalpropertiesofpulses.

NutsandOilSeedsProcessingandTechnology:

- **Nuts Processing methods, Oil seeds processing:** Oil extraction methods and refiningprocess;byproductsutilization;Effectofprocessingonnutritivevalueandphysiochemicalpropertiesofvegetableoils.

UNIT-III

VegetablesProcessingandTechnology:

- **Pigments:** Classification, effects on processing of vegetables; Preliminary processingofvegetables;
- **Vegetable products:** Fermented and nonfermented and its shelf life; Vegetable wasteutilization; Effect of processing on nutritive value and physiochemical properties ofvegetable.

FruitsProcessingandTechnology:

Conceptofmaturity,ripeningandsenescence;Methodsoffruitprocessingtechnologies:traditionaland newmethods.

Fruitproducts:FermentedandNon-fermented;Effectofprocessingonnutritivevalueandphysiochemicalpropertiesoffruits;

Browningreactions:typesandmechanism;preventionmethods;Fruitwasteutilization.

MilkProcessingandTechnology:

Milktypes,composition,physiochemicalproperties;Milkprocessing-Separation,centrifugal process, natural creaming, pasteurization, sterilization, homogenization. Milkstorage;Effectsofprocessingonnutritivevalueandphysicochemicalpropertiesofmilk

UNIT-IV

EggProcessingandTechnology:

Eggprocessing andstorage;Effectof processingonnutritivevalue and physiochemicalpropertiesofeggs;changesineggqualityduringstorageandpreservationmethods.

MeatProcessingandTechnology:

Meat:processingandstorage; Factorsinfluencingmeatquality; Ageingandtenderizationofmeat.

Poultry: Processingandstorageofpoultrymeat;Preservationmethodsforpoultry.

Fish: Processingandstorage;Preservationmethodsforfish.Effectofprocessingonnutritivevalueandphysiochemical propertiesofmeat, poultryandfish.

UNIT-V

Introductionofpost-harvesttechnology

Introductiontopost-harvesttechnologyofagriculturalproduce;StatusofProduction,Losses,Need,ScopeandImportance.

Post-HarvestLoss-Definition,FactorscontributingtoPost-harvestLoss;andTechnologiesandPracticestoreducePost-harvestLosses.

TEXTBOOKS

- ShakuntalaManay NShadakCheraswamyM. (2004)FoodFacts andPrinciples. Newagepublisher.2nd edition.
- RodayS.(2011).FoodScience.Oxfordpublication.1st edition.
- BSrilakshmi(2015)Foodscience.NewAgePublishers.6th edition.FellowsP.(2000).FoodProcessingTechnology,2ndEdition.
- WoodheadPublishingLimitedandCRCPressLLC.1st edition.
- AvantinaSharma.(2017).TextbookoffoodscienceandTechnology.CBSPublish eresand distributesltd.3rd edition.

REFERENCES

- Raocg.(2006).Essentialsoffoodprocessengineering.PHIlearningprivateltd.
- JanetDWardandLarryWard.(2006).PrinciplesofFoodScience.StemPublishers.4th edition.
- SrivastavaRPandKumarS.(2006)FruitsandVegetablesPreservation-PrinciplesandPractices.InternationalBookDistributingCo.3rd edition.
- WBCrusess.(2004).CommercialUnitandVegetableProducts.W.V.SpecialIndianEdition,PubAgrobiosIndia.2nd edition.
- ForsytheSJandHayesPR(1998).FoodHygiene,MicrobiologyandHACCP.GaitersburgMarylandAspen.
- Eskein.(2012).BiochemistryofFood.Elsievierpublications.1st edition.

ELEARNINGRESOURCES:

http://www.fao.org/3/V5030E/V5030E00.htmhttps://fmtmagazine.in/fruits-vegetables-processing-technologies/https://www.actioncontrelafaim.org/wp-content/uploads/2018/01/technical_paper_phl.pdfhttps://www.nutsforlife.com.au/resource/nuts-and-processing/https://www.fssai.gov.in/

MAPPING(CO/PSO):

CO/PO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	2	2	2
CO2	3	3	2	2	3	2
CO3	2	3	2	1	2	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
Average	2.8	3	2.6	2.2	2.6	2.4

PEDAGOGY:

Lecture,JournalReviewing,Powerpointpresentations,AssignmentsandDiscussions

SEMESTER–

IICORE–IV

ADVANCEDDIETETICS

CREDIT:

5SEMESTER:IIYEA

R:1

HOURS PER WEEK

:15COURSEOBJECTIVES:

- ToacquireKnowledgeregardingtheeffectofvariousdiseasesonnutritionalstatusandnutrientrequirement
- Tounderstandthemodificationsinnutrientsanddietaryrequirementsforthera peuticcondition.
- Tolearnrecentconceptsindietarymanagementofdifferentdiseases.

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentswillbeableto

CONo.	COStatement
CO1	CritiquetheNutritionalscreeningtechnique
CO2	Comprehendthecurrentconceptsoftherapeuticdietsand criticallyill
CO3	Implementthedietaryprinciplesonvariousdisorders.
CO4	Acquiretheknowledgeofdietcounselingskills.
CO5	Applythedietaryprinciplestomanagethelifestyledisordersin thesociety

UNIT-I

- Nutritionalscreening,Nutritionalcareprocess, NutritionalAssessment,Nutritionaldiagnosis,NutritionalIntervention,Monitoringandeva luation.
- Basicconceptsofdiettherapy– TherapeuticadaptationsofNormaldiet,Principlesandclassificationoftherapeuticdiets.Rou tineHospitaldiets–Regular,soft,fluiddiet

- Nutritional Management in critical care -Nutritional screening and nutritional Statusassessmentofcriticallyill,Nutritionalrequirementaccordingtothecriticalcondition
- Nutritionalsupportsystems:Enteralandparenteralnutritionsupport-Types,compositionand complications.

UNIT–II

MedicalNutritiontherapyforgastrointestinalandliverdisorders

- UpperGastrointestinal tract Diseases – Nutritional care and diet therapy in Diseases ofoesophagus-Oesophagitis,Gastroesophagealrefluxdisease[GERD]andHiatushernia.
- Disorders of stomach: Indigestion, Gastritis, Gastric and duodenal ulcers, and dumpingsyndrome
- LowergastrointestinaltractDiseases/Disorders-CommonSymptomsofIntestinaldysfunction-Flatulence,constipation, hemorrhoids,diarrhea,steatorrhoea,Diseasesofthe large intestine-Diverticular disease, Irritable bowel syndrome, inflammatory boweldisease
- DiseasesofSmallintestine-Celiacdisease,tropicalsprue,intestinalbrushborderenzymedeficiencies.
- DiseasesoftheLiver- hepatitis, hepatic coma, cirrhosis, cholecystits,cholelithiasisandpancreatitis,ZollingerEllisonsyndromeandBiliarydyskinesia.

UNIT-III

MedicalNutritiontherapyforPulmonarydisease-

- EffectofMalnutritiononpulmonarysystem,effectofpulmonarydiseaseonnutritionalstatus,chronic pulmonary diseases- Asthma, cystic fibrosis, chronic obstructive pulmonary diseaseandPneumonia-Pathophysiologyanddietarymanagement.

MedicalNutritiontherapyforRheumaticdisease-

- Etiology, Pathophysiology of Inflammation of Rheumatic diseases, Rheumatoid Arthritis,Osteoarthritisand sjogrensyndrome.

Nutritionalmanagementofphysiologicalstress-

- Classification, Complications,Metabolic changes inprotein andelectrolytes and Dietarymanagementofburns,dietarymanagementoftraumaandstress.

UNIT–IV

- **NutritionalManagementonWeightimbalance-**Regulationoffoodintakeandpathogenesis of obesity and malnutrition and starvation; Weight Imbalance: prevalenceandclassification.
- **Underweight-**Etiologyand Dietarymanagement**;Obesity-**Etiology,classification,Energybalance,dietarymodificationsandBariatricsurgery-typesanddietarymodificationsofpreandpostbariatricsurgery.
- **Nutritional Management in metabolic disorders-** Prevalence, Etiology, risk factors,complicationsanddietarymodificationsofdiabetesmellitus.

UNIT-V

- **Nutritional management of cardiovascular diseases-** Etiology, riskfactors, clinicalfeaturesanddietarymodificationsofDyslipidemia,Atherosclerosis,Hypertension,Ischemicheartdisease,Congestivecardiacfailure.
- **NutritionManagementofRenalDisease-**Etiology,Clinicalandmetabolicmanifestations, Diagnostic tests, Types-Glomerulonephritis, Nephroticsyndrome , RenalFailure:Acuteandchronic,ESRD, NephrolithiasisandDietarymodifications.
- **Nutritionalmanagementincancer-** Pathogenesisandprogressionofcancer,types,SymptomsandDietarymanagement.

TEXTBOOKS:

1. MahanL.K.andSylviaEscott-Stump.(2000).Kraus'sFoodNutritionandDietTherapy.W.B.SaundersCompanyLondon. 10th edition.
2. B.Srilakshmi.(2007).Dietetics.K.K.GuptaForNewage InternationalPvt.Ltd.NewDelhiPublisher.
3. AntiaF.P.andPhilipAbraham.(2001).ClinicalNutritionandDietetics.OxfordPublishingCompany.
4. PassmoreP.andM.A.EastWood.(Digitisedin2010).HumanNutritionAndDietetics.ChurchillLivingStone.
5. S. R.Mudambi.and M.K. Rajagopal.(2009).Fundamentals, Food Nutrition and Diettherapy.NewAgePublishers.5th edition.
6. RobinsonCh.,M.B.Lawlea,W.L.,Chenoweth,andA.E.,Carwick.(1990).BasicNutritionandDiettherapy,MacmillanPublishingCompany.

REFERENCES:

1. GarrowJS,JamesWPT,RalphA.(2000).HumanNutritionandDietetics.ChurchillLivingstone,NY.10th edition.
2. GroffLJames,GropperSSareen.(2000).AdvancedNutritionandHumanMetabolism.West/Wadsworth,UK.3rd edition.
3. SueRodwellWilliams.(1993).Nutrition,DietTherapy.W.B.SaundersCompanyLondon.7 th edition.
4. Whitney,E.N.andC.B.Cataldo.(1983).UnderstandingNormalandClinicalNutrition.WestPub.S1.Paul.

E-LEARNINGRESOURCES:

www.nutrition.gov-ServiceofNationalagriculturallibrary,USDA.www.nal.usda.gov/fnic -Food and Nutrition informationcentre.www.healthyeating.org. www.eatrightpro.org.https://www.globalhealthlearning.org.

MappingofCowithPSO:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO5	PSO6
CO1	3	3	2	3	1	2
CO2	2	3	3	3	1	2
CO3	3	3	3	3	1	3
CO4	2	3	3	3	1	2
CO5	3	3	3	3	1	3
Average	2.6	3	2.8	3	1	2.4

PEDAGOGY

Lecture,journal reviewing,Assignments,
Powerpointpresentations,video presentations.

CORE-

VNUTRITIONALBIOCHEMISTRY

CREDIT:

5SEMESTER:IIYEA

R:I

HOURSPER WEEK:10

Courseobjectives:

- Understandtheneedforthestudyofbiochemistryasthebasisfornutritionalsciences.
- Makestudentsawareofmetabolismofproximateprinciplesandothers.
- AbasicunderstandingofthefunctionsofbiologicalsystemsinrelationtoNutritionalbiochemistry.

COURSEOUTCOME:

Oncompletionofthecoursethestudentswillbeableto…

CONo.	COStatement
CO1	Understandtheroleofenzymesandcoenzymesinbiologicaloxidation.
CO2	Gain knowledge on metabolism and regulation of carbohydrates.
CO3	Understandtheconceptofmetabolismandbioenergeticsoflipids.
CO4	Discuss the classification, structure,organizationandmetabolicpathwayofproteins.
CO5	Comprehendthebiologicalmetabolismandfunctionsofnucleicacidandunderstandrecentconceptsinbiochemistry.

UNIT–I:Biologicaloxidationandenzymes

- Biologicaloxidation,ElectrontransportchainandOxidativePhosphorylation.Enzymes – Definition, Types , mechanism of action, factors affecting enzyme activity,coenzyme,roleofBvitamin ascoenzyme.
- Free radicals – Definition, formation in biological systems. Antioxidants – definition,Roleofantioxidantsinprevention ofdegenerativedisorders

UNIT–II:MetabolismofCarbohydrates

- Glycolysis,Citricacidcycle,Glycogenesis,Glycogenolysis,Gluconeogenesis,HexoseMonophosphateShuntandbioenergetics.
- Hormonalregulationsofbloodglucosehomeostasis

UNIT-III:Proteinandaminoacidmetabolism

- Classificationofaminoacids,OxidativeDeamination,decarboxylation,transamination and transmethylation of amino acids, urea cycle, biosynthesis of non-essentialaminoacids,catabolismofessentialaminoacids.Proteinbiosynthesis.

UNIT–IV:MetabolismofLipids

- Classification of fatty acid, Biosynthesis of fatty acids, beta oxidation of fatty acidsandketonebodies.Essentialfattyacids– typesandfunctions.Metabolismofphospholipids,andcholesterol.Lipoproteins– classificationandfunction.

UNIT-V

- Overview of intermediary metabolism of carbohydrates, protein and lipid. Hormonalregulationofcarbohydrateproteinandfatmetabolism
- Structuralcomponentsandfunctionsofnucleicacid,StructureofDNA,DNAReplication,RNAsynthesis– typesandfunctionsandmetabolism,translation.RecombinantDNAtechnology,MetabolismofXenobiotics,Nutrigenomics

TEXTBOOKS

- Jain,J.L.,Jain,S.,&Jain,N.(2005).FundamentalsofBiochemistry.S.Chand&Company Ltd.Ramnagar,NewDelhi-110055.6th revisededition.
- Bettelheim,F.A.,Brown,W.H.,Campbell,M.K.,&Farrell,S.O.(2009).*General,Organic& Biochemistry*.Brooks/ColeCengageLearning.
- Champe,P.C.,Harvey,R.A.,&Ferrier,D.R.(2005).*Biochemistry*.LippincottWilliams&Wilkins,6th edition,WoltersKluwer,London.
- Talwar,G.P.,&Srivastava,L.M.(2002).*Textbookofbiochemistryandhumanbiology*.PHILearning Pvt.Ltd.
- Murray,R.K.,Granner,D.K.,Mayes,P.A.andRodwell,V.W.(2000):25th edition.HarpersBiochemistry.MacmillanWorthPublishers.

REFERENCEBOOK

- Marshall,W.J.,Lapsley,M.,Day,A.,&Ayling,R.(2014).ClinicalBiochemistryE-Book:MetabolicandClinicalAspects. ElsevierHealthSciences.
- Bender,D.A.(2003).Nutritionalbiochemistryofthevitamins.CambridgeUniversityPress.
- Albanese,A.(Ed.).(2012).NewerMethodsofNutritionalBiochemistryV3:WithApplicationsandInterpretations.Elsevier.
- Champe,P.C.,Harvey,R.A.,&Ferrier, D. R. (2005).Biochemistry.LippincottWilliams&Wilkins.
- Lieberman,M.,&Ricer,R.E.(2009).Lippincott'sIllustratedQ&AReviewofBiochemistry. LippincottWilliams&Wilkins.

E-LEARNINGRESOURCES:

- https://www.udemy.com/share/1027yA/
- https://www.classcentral.com/course/swayam-biochemistry-5229
- https://www.classcentral.com/course/edx-biochemistry-biomolecules-methods-and-mechanisms-12585
- https://www.classcentral.com/course/swayam-experimental-biochemistry-12909
- https://youtu.be/y6YGZfcAegw

MappingofCOwithPSO

CO/PSO	PSO1	PSO2	PSO3	PSO 4	PSO5	PSO6
CO1	3	3	2	1	1	3
CO2	3	3	2	1	1	3
CO3	3	3	2	1	1	3
CO4	3	3	2	1	1	3
CO5	3	3	3	1	1	3
Average	**3**	**3**	**2.2**	**1**	**1**	**3**

PEDAGOGY(TEACHINGMETHODOLOGY):

GroupDiscussion,Casestudy,seminar,journalreviewing,Assignments,Powerpointpresentations.

COREVI
ADVANCEDDIETETICSPRACTICALS

CREDITS:
4SEMESTER:IIYE
AR:1
HOURSPERWEEK:15

Courseobjectives:

- Toacquireknowledgeinplanningdietsforvariousdisorders.
- Togainknowledgeindiet counsellingandeducatingpatients.
- Tounderstandthetherapeuticmodificationsofdiet.

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentswillbeableto

CONo.	COStatement
CO1	Evaluatevarioustherapeuticdiets
CO2	Identifytherequirementsfordiseaseconditionsandcritically illpatients.
CO3	Assessandplanthedietsforvariousdiseaseconditions.
CO4	Createknowledgeinnutrientcalculationsanddietaryprinciples.
CO5	Designthepersonalizeddietsfordifferentindividualsinthesociety

1. Routinehospitaldiet:Regulardiet,Clearliquid,Softdiet,FullliquiddietandPlanningand preparing Enteralfeed plan[8hrs].
2. Assessingrequirementsandplanningdietforobeseandunderweightindividual[6hrs]
3. PlanningandpreparingdietforDiabetesMellitus[IDDMandNIDDM][6hrs].
4. PlanningandpreparationofdietforAtherosclerosiswithHypertension[6hrs]
5. Assessingandplanningdietsforthefollowingconditions[13hrs]
    a. Celiacdisease
    b. Lactoseintolerance.
    c. GERD
    d. Pepticulcer
    e. Hepatitis
    f. Cirrhosis
6. PlanningandpreparingdietforPneumonia[6hrs]
7. PlanningandpreparingdietforRheumaticarthritis[6hrs]

8. Planningandpreparationofdiet forGlomerulonephritis[6hrs]
9. Planningandpreparationofdietforcanceraccordingtothecondition[6hr]
10. PlanningandPreparingdietforpreandpostBariatricsurgerypatients[6hrs]
11. Assessmentandplanningdietforpostburncondition[6hrs].

TEXTBOOKS:

- Stump SE. (2012).Nutrition and diagnosis related care. Lippincott Williams and Wilkins.Canada.7th edition.
- Width.M & Reinhardt.T. (2018).The Essential Pocket Guide for ClinicalNutrition.WoltersKluwerPublishers.2nd edition.
- Whitney EN and Rolfes S.R. (2002). Understanding Nutrition, 9th edition,West/Wordsworth.
- GuthrieH.(2002).IntroductoryNutrition.CVMosbyCo.St.Louis.
- EliaM,LjunggvistO,StrattonRJ,LanhamSA.(2013).ClinicalNutrition.TheNutritionSociety Textbook.WileyBlackwellPublishers.2nd edition.
- Mitch,W.andIkizler,Alp.(2010).HandbookofNutritionandtheKidney.LippincottWilliamsandWilkins,NewDelhi.6th edition.
- MahanLK,StumpSEandRaymondJL.(2012).Krause'sFoodandNutritionCareProcess.ElsevierSaunders.Missouri.13th edition.

REFERENCES:

- GopalanC.,RamSastriB.V.andBalSubramaniamS.C.(2006).NutritiveValueofIndianFoods.Hydrabad,NationalInstituteofNutrition.IndianCouncilofMedicalResearch.
- ClinicalDieteticsManual.(2018).IndianDieteticAssociation.2nd edition.
- PeggyStanfield.Y.H.Hui.(2010).NutritionandDiettherapy.JonesandBartlettpublishers.
- William's.(2012).BasicNutritionandDiettherapy.14th edition.

E-LEARNINGRESOURCES:

- www.nutrition.gov-ServiceofNationalagriculturallibrary,USDA.
- www.nal.usda.gov/fnic-FoodandNutritioninformationcentre.
- www.healthyeating.org.
- www.eatrightpro.org.
- https://www.globalhealthlearning.org.

Mapping:(CO/PSO)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	3	1	2
CO2	3	3	3	3	1	3
CO3	3	2	3	3	2	3
CO4	3	2	3	3	3	2
CO5	3	3	3	3	3	3
Average	**2.8**	**2.6**	**3**	**3**	**2**	**2.6**

PEDAGOGY

GroupDiscussion,Casestudy,Assignments,Planningmenusincharts.

ELECTIVE–
IIIRESEARCHMETHODSINNUTRITION

CREDIT:
3SEMESTER:IIYEA
R:1
HOURSPERWEEK:15

CourseObjectives:

- To provide students understanding about the basic concepts, approaches and methods inconducting research therebyenabling them to appreciate andcritique thenuancesofdesigningaresearchstudyaswelltheethicaldimensionsofconductingresearches.
- Toexplaintheimportanceofresearchinfoodscienceandnutrition.
- To make students understand the types of tools applicable to research problem and developskillsofpreparingoutlineofresearchworkandconstructcommondata collectiontools.

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentwillbeableto

CONo.	COSTATEMENT
CO1	Demonstrateknowledgeofthescientificmethod,purposeandapproachest oresearchandbecomeaqualifiedresearcher.
CO2	Identifyandselectresearchsamplingandscalesofmeasurement
CO3	Understand the typesoftools applicable toresearchproblem anddevelopskillsofpreparingoutlineofresearchworkand constructcommondatacollectiontools
CO4	Assessthenumerical data forproviding statisticalevidencesto supporttheresearchresultsandinterpretationofdatawiththeuseoftablesan d pictorialrepresentations
CO5	PresentresearchdatainascientificmannerandUnderstandthekeyelements ofaresearchreportandvariousapplicationsofcomputer innutritionresearch

UNIT-I:FoundationofNutritionResearch

1. Meaning, Objectives and Classification of Research Designs –Exploratory, Descriptive– Longitudinal and Cross sectional, Observation-Participant andNon-participant, Epidemiological Surveillance, Retrospective, IN VIVO, IN VITRO andExperimental – Pre-Experimental, Quasi Experimental, True Experimental and StatisticalExperimentaldesigns.
2. NeedofResearchinFoodScienceandNutrition
3. ResearchProcess-
    - SelectionandFormulationofResearchProblem
    - ObjectivesofResearch:Explanation,ControlandPrediction
    - Hypothesis:Definition,Importance,TypesandErrors-I&II

- DecidingVariables

UNIT-II:SamplingandSampleDesign

SamplingProcessandCharacteristicsofgoodSampling

1. Classificationof SamplingTechniques- Probabilityand NonProbabilitySampling
2. PreparationofLaboratoryFoodSamples
3. SamplingandNon-SamplingErrors

MeasurementsandScaling-

1. FundamentalandComparativeScales–Meaningandtypes

- NominalScale
- OrdinalScale
- IntervalScale
- RatioScale

2. NoncomparativeScales–Meaningandtypes

1. ContinuousRatingScale
2. ItemizedRatingScale

- LikertScale
- SemanticDifferentialScale
- StapelScale

UNIT-III:DataCollectionandPreparation

1. DataCollection–Tools–
PrimaryData

1. Interviews-structuredandunstructured
2. Casestudies
3. Questionnaire
4. Surveys–Pilot&KAP
5. LaboratoryExperiments

SecondaryData

1. PublishedSources
2. UnpublishedSources
3. ReliabilityandValidityofTools–Meaning
4. DataPreparationProcess–
   - Editing
   - Coding
   - Classification
   - Tabulation

UNIT-IV:StatisticalMethods

1. ParametricandNon-Parametrictests–DifferenceandApplications

2. DataAnalysisProcess-

1. DescriptiveAnalysis-
   - GraphicalandDiagrammaticPresentations

- CentralTendency–Mean,Median&Mode
- Dispersion-StandardDeviation

2. StatisticalInference–TestsofHypothesis
   - t–test
   - ANOVA–OneWay&TwoWay
   - Chi-squaretest–GoodnessofFit&TestofIndependence

UNIT-V:ReportingtheFindingsandComputerApplications

1. ReportWriting–
   - Importance
   - Types
   - Mechanics
   - GuidelinesandPrecautions
   - EndNotes-
     Bibliography,Appendices,FootnotesandGlossaryofterms
2. Computerapplications innutritionresearch- Importance andUses

3. ApplicableStatisticalAnalysisSoftware-
   - LiteratureSearching-PubMed
   - DataAnalysis-MicroSoftExcel,SPSS,Minitab
   - PlagiarismChecker–Turnitin,Scribbr

TEXTBOOKS

- KothariCR(2004).ResearchMethodology–Methods&Methodology.Delhi,NewAgeInternationalPvtLtd.2nd edition
- Chawla,DeepakandNeenaSondhi.(2018):ResearchMethodology-ConceptsandCases.Noida,VikasPublishingHousePvtLtd. 2nd edition.
- Gupta,SP(2019).StatisticalMethods.NewDelhi.SChand&Sons.45th edition.
- Copper, H.M. (2002). Intergrating Research: A guide for literaturereviews. California:Sage,2ndedition.
- Kerlinger, Foundation of Educational Research Ingle P.O. Scientific Report Writing.Nagpur,SarlaP.Ingle.
- RanjitKumar(2011).ResearchMethodology:astep-by-stepguideforbeginners,SAGEPublications.3rd edition.
- Anderson, David R and et.al. (2013). Statistics for Business and Economics. Delhi,CengageLearning IndiaPvtLtd.11th edition.
- Bandarkar, P.L. and Wilkinson T.S. (2000). Methodology and Techniques of SocialResearch.HimalayaPublishingHouse,Mumbai.
- Bell, Judith (2005): Doing your Research Project – A guide for first time researchers ineducation,healthandsocialscience.England,OpenUniversityPress.4th edition.
- Danial,WayneWandChadLCross(2017):Biostatistics–BasicConceptsandMethodology For the Health Sciences – International Student Version. New Delhi,ArEmmInternational,10th edition.

Mapping:(CO/PSO)

CO/PSO	PSO1	PSO2	PSO 3	PSO4	PSO5	PSO6
CO1	1	3	2	2	3	2
CO2	1	1	1	0	2	1
CO3	3	3	3	3	3	2
CO4	1	3	3	0	3	1
CO5	3	2	3	0	0	1
Average	**1.8**	**2.4**	**2.4**	**1**	**2.2**	**1.4**

PEDAGOGY

Lecture,PowerPointPresentation,Demonstration,GroupDiscussion,Assignment,SeminarsandOral&WrittenRevision

ELECTIVE–

IVPERSPECTIVESOFHOMESCIENCE

CREDITS:
3SEMESTER:IIYE
AR:I
HOURSPER WEEK:10

Courseobjectives:

Toenablestudentstohaveasoundknowledgeinvariousbranchesof HomeScienceforstrengtheningtheextensionand research base.

SPECIFICOBJECTIVESOFLEARNING:

Onsuccessfulcompletionoftheseunits,studentsareexpected:

- TodescribetheimportanceofeachbranchofHomeScience
- TounderstandtheessenceofeachsubjectTopreparethemforUGCNET,SLETandASRB

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentwillbeableto-

CONo.	COSTATEMENT
CO1	UnderstandtheconceptofExtensionEducationanditsimportance
CO2	Comprehendthekeyaspectsofhumangrowthanddevelopmentandrealizetheimportanceofmasteringdevelopmentaltasksof eachlifespanstage
CO3	UnderstandthebasicconceptsofTextileandClothing
CO4	Listpersonalgoalsandvalues,setliving standards
CO5	UnderstandthemeaningofGuidanceandCounsellingandCareer perspectivesinHomeScience

UNIT–IExtensionEducation

a. Meaning,definition,objectives,characteristics,principles
b. Extensionteachingmethods-typesandmethods
c. Qualitiesofagoodextensionworker
d. Communication,InnovationandSocialchange

UNIT–IIHumanDevelopment

a. Growth,Development,MaturationandLearning
b. PrinciplesandDevelopmentalstagesandtask
c. ParentalDisciplinaryTechniques–meritsanddemerits
d. EarlyChildhoodEducation–Objectives,TypesofNurserySchools.

e. Exceptionalchildren–
Deaf,Blindness,PhysicalImpairment,MentalRetardedandGiftedness,
Rehabilitation.

UNIT–IIITextilesandClothing

a. Classificationandgeneralpropertiestextilefibres.
b. ProcessingandmanufactureofCotton,Silk,WoolandRayonfibres.
c. Yarn:Classification.
d. Fabricconstruction-woven,non-wovenandknittedfabric
e. Clothing:selectionforthefamily.

UNIT–IVFamilyResourceManagement

a. HomeManagement–Meaning,objectivesandprocess
b. Resources-Classificationandcharacteristics
c. Time,MoneyandEnergymanagement
d. Decision making-StepsandMethodsofresolvingconflicts
e. Worksimplification- Importanceof worksimplification.Mundel's classes ofChange
f. PrinciplesandElementsofInteriordesign,Variouscoloursandcolourschemes.

UNIT–VGuidanceandCounselling

a. Meaning,nature,typesandscopeofguidanceandcounselling
b. VariousstepsandtechniquesofGuidanceandcounselling
c. Needandimportanceofeducationalguidance.

TEXTBOOKS:

1. Jha,J.K.(2002).EncyclopaediaofTeachingofHomeScience,Vol.I,IIandIII.NewDelhi:AnmolPublications.
2. Suriakanthi.A.(2002).Child Development-An Introduction Gandhigram: KavithaPublications.
3. Srilakshmi.B.(2015).FoodScience.NewDelhi.NewAgeInternationalPvt.Ltd.
4. PremlataMullick(2016),4th edition,KalyaniPublishers.

REFERENCES:

- Serene and Ahlawat Santos Shekhar (2013). Textbook of Home Science ExtensionEducation.
- TamiJamesMooreandSylviaM.Asay(2008).FamilyResourceManagement,SagePublications.
- DianeE.Papalia(2004).9th edition,HumanDevelopment,McGrawHillIndia.
- RaniK.SudhaandSrivastavaSushila,TextbookofHumanDevelopment:ALifespanDevelopmentApproach,S.Chand&CoLtd.

Mapping:(CO/PSO)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	3	3	1	3
CO2	3	2	3	3	2	3
CO3	3	2	3	3	1	3
CO4	3	2	3	3	1	3
CO5	3	1	3	3	1	3
Average	**3**	**1.6**	**3**	**3**	**1.2**	**3**

PEDAGOGY

Lecture, PowerPoint Presentation, Demonstration, GroupDiscussion,Assignment,LibraryVisits,SeminarsandOral &WrittenRevision

SKILLENHANCEMENTCOURSE[SEC]-I

FOODPRESERVATION

CREDIT:
2SEMESTER:IIYEA
R:1
HOURSPERWEEK:2

LEARNINGOBJECTIVES

Toenablestudentsto

1. LearnthebasicconceptsandimportanceofFoodPreservation
2. UnderstandthedifferentmethodsofFoodPreservation
3. Chooseappropriatefoodhandlingandstoragetechniques

COURSEOUTCOME

CONo.	COSTATEMENT
CO1	DescribethebasicconceptsandprinciplesofFoodPreservation
CO2	Identifythebestmethodsofstorageofdifferentfoodsbasedontheirshelf life. Recommend appropriatepostharvesttechnologyprocedures thatincreaseshelflifeoffood
CO3	Analyze the use of low and high temperature to preserve food and identify theappropriatemethodtopreservedifferentfoods
CO4	Discusstheuseandeffectsofdifferentpreservativesonthequalityoffoods
CO5	Appreciatetheuseofmoderntechnologyinfoodpreservationandmanaging foodwastage

UnitIIntroductiontoFoodPreservation

Concept,theimportanceoffoodpreservation.Commontermsusedinfoodpreservation.Differentmeth odsand Principlesofpreservation.

UnitIIPreservationbyLowTemperature

UseofColdandRefrigeratedStorage.UseofFreezingtemperatures:Slowandfastfreezingoffoodsand Cryogenicfreezingof foods,dehydrofreezing,Frozenstorageandthawingoffoods.

UnitIIIPreservationbyHighTemperature

Preservationoffoodsbyhightemperatures.Blanching,PasteurizationandSterilizationoffoods. Generalprocessofcaningoffoods.

UnitIV PreservationbyDrying

Principlesandapplicationofdryinganddehydrationoffoods.Differenttypesofdryingand

dryers.

UnitVPreservationusingChemicalsandIrradiation

Preservation usingChemicalpreservatives-Squashes,Ketchup andMarmaladePreservation by Irradiation: Gamma rays, X-rays and Electron BeamPreservationbyhigh osmoticpressure: HighConcentrationofSugar-jamsandJellies
HighConcentrationofSalt-PicklingandCuringofmeat.

REFERENCESBOOKS

1. PrakashTriveni(2010).FoodPreservation,AadiPublication,Delhi.
2. M.ShafiurRahman(2007):HandBookofFoodPreservation,MarcelDekkerInc,NewYork.
3. McWillimsandPaine(2009):ModernFoodPreservation,SurjeetPublications
4. Karnal,MarcusandD.B.Lund(2003).“PhysicalPrinciplesofFoodPreservation”.
5. Rutledge.VanGarde,S.J.andWoodburn.M(2001)“FoodPreservationandSafetyPrincipl esandPractice”.SurbhiPublications
6. Sivasankar,B(2002).“FoodProcessing&Preservation”,PrenticeHallofIndia
7. Khetarpaul,Neelam(2005)“FoodProcessingandPreservation”,DayaPublications
8. NormanN.Potter,JosephH.Hotchkiss:Foodscience,5th edition.NewYork:Chapman&Hall

E-LEARNINGRESOURCES

https:// www.embibe .com/food - preservation/https://agripathshala.com/lessons/principles-of-food-preservationwww.onlinebiologynotes.com/food-preservation-from-microbial-spoilage-principleshttps://www.researchgate.net/publication/347909697_FOOD_PRESERVATION

MappingofCowithPSO:

CO/PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO5	PSO6
CO1	3	3	2	3	1	2
CO2	2	3	3	3	1	2
CO3	3	3	3	3	1	3
CO4	2	3	3	3	1	2
CO5	3	3	3	3	1	3
Average	2.6	3	2.8	3	1	2.4

PEDAGOGY

Lecture,journalreviewing,Assignments,Powerpointpresentations,videopresentations.

SEMESTERIIICOR

E–VII

MICRONUTRIENTS

CREDITS:
5SEMESTER:III
YEAR:II
HOURSPERWEEK:15

COURSEOBJECTIVES

1. Toenablesthestudentstolearnthefunctions,deficiencysymptoms,food sourcesandrequirementsofthedifferentmicronutrients.
2. To Gain knowledge of nutrients requirement and management ofmicronutrientsduringvariousstagesoflifeanddisease
3. Togaininsightaboutrecentconceptandfindingsinfieldofnutritionandapplicationofth esametopreventdisease

COURSEOUTCOMES:

Oncompletionofthecoursethestudentswillbeableto…

CONo.	COStatement
CO1	Evaluatethespecificroleoffunctionalfoodsandnutraceuticalsinpreventi onofdegenerativedisease.
CO2	Understandtheimportanceofmicronutrientsingrowthanddevelopmentofh umans.
CO3	Analysetheimportanceofdietinmaintaininghumanhealthtocombatnutri entdeficiencyin thecommunity
CO4	Gainin-depthknowledgeofthephysiologicalandmetabolicfunctionsofvitaminsand mineralsandtheirimplications
CO5	Analysetherecentadvancesinthefieldofmicronutrientandresearchforthe welfareof thecommunity

UNIT -I **15hours**

Distribution in the body, functions, effects of deficiency, food sources, requirement andrecentresearch of macro minerals-Calcium,Phosporous,Magnesium,Potassium,Sodiumand Chloride.

UNIT–II **15hours**

Distribution in the body, functions, food sources, requirement deficiency, toxicity andrecent research of micro minerals and trace minerals. Micro minerals - – lron, Zinc,Fluoride,Copper,IodineandManganese.TraceMinerals-
Selenium,Cobalt,Chromium, Silicon, Boron and Nickel Selenium and Vitamin E relationship, Chromiumandglucosetolerancefactor.

UNIT -III **15hours**

Distribution in the body, functions, food sources, requirement deficiency, toxicity andrecentresearchofFatSolubleVitaminsA,D,EandK

UNIT –IV **15hours**

Distribution in the body, functions, food sources, requirement deficiency, toxicity andrecentresearchofWatersolublevitamins–
Watersolublevitamins:VitaminC,Thiamine,Riboflavin,Niacin,PantothenicAcid,Biotin,FolicAcid,Vitamin B12,VitaminB6,Cholineand Inositol.

UNIT - V **15hours**

RECENTCONCEPTSINNUTRITION:
Immuno-nutrientsandAntioxidants.Definition,classificationandfunctionoffunctionalfood and nutraceuticals.Antinutrients present in various food groups – Cereals , legumes and nuts and oilseedsFoodand drug interaction.

TEXTBOOKS

1. Guthrie,H.A.(2001)–
"IntroductoryNutrition",Tenthedition,C.V.MosbyCompany,St.Louis.
2. Bogert,J.G.V.,Briggs,D.H,Calloway,(2000)."Nutritionandphysicalfitness",11th editionW.B.SaundersCo.,Philadelphia,London,Toronto.
3. Wardlaw,G.MandKessel,M,(2002)"PerespectiveinNutrition",5thedition,McGrawHill,NewYork,NewDelhi.
4. Willium,S.R.(2000)."NutritionandDietTherapy",MosbyCo.,St.Louis.
5. Sizer,F.SandWhitneyE.R.(2003)."Nutrition,ConceptsandControversies"9th edition,ThomasWadsworth,Australia.

REFERENCEBOOK

1. Brown, J.E. (2002). "Nutrition Now", 3rd edition, Wadsworth Thomson LearningNewYork.
2. Maurice, E. Shils, James A. Obson, Moshe Shike, (2000). "Modern Nutrition inHealth and Disease", 8th Edition, Vol I and II, Lea &Febiger Philadelphia, A WaverlyCompany.
3. Mahan L.K. and Stamp, S.E (2000). "Krause's Food Nutrition and Diet Therapy",11thedition,W.B.Saunder'sCompany,Philadelphia.
4. Toteja, G.S and Singh P (2004). "Micronutrient Profile of Indian Population",ICMRPublication,NewDelhi.
5. D. M. Swaminathan (2002). " Principles of Nutrition and Dietetics", BAPPCO, 88,MysoreRoadBangalore– 560 018.

E-LEARNINGRESOURCES:

https://www.udemy.com/share/1027yA/
WHO|Thee-learningplatformNutritionKnowledgeHublaunchWFPNutrition's LearningPlatform-UNWorldFoodProgrammeNutritionOnlineCourses|Coursera
E-LearningPrograms(nestlenutrition-institute.org)
WFPNutrition'sLearningPlatform|HumanitarianLibrary

Mapping:(CO/PSO)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	2	3
CO3	3	3	3	3	2	3
CO4	3	3	3	3	2	3
CO5	3	3	3	3	2	3
Average	**3**	**3**	**3**	**3**	**2**	**3**

PEDAGOGY(TEACHINGMETHODOLOGY):

GroupDiscussion,Casestudy,Seminar,Journalreviewing,Assignments,Powerpoint presentations.

CORE–

VIIIPERFORMANCENUTRITION

CREDITS:
5SEMESTER:III
YEAR:II
HOURSPERWEEK:15

COURSEOBJECTIVES:
Toenablethe studentsto

- LearnabouttheroleofnutrientsinenhancingSportsPerformance.
- Understandthefundamentalsofplanningdietfordifferentsports.
- Knowaboutthedifferenttypesofsportssupplementsandnutritionforspecialathletes.

COURSEOUTCOME:
Onsuccessfulcompletionofthecoursethestudentswillbeableto

CONo.	COStatement
CO1	Analyzeandassessthebodycompositionofathlete.
CO2	ComprehendtheroleofMacroandmicronutrientstowards athleticperformance
CO3	Emphasizetheroleofnutritionincompetitiveperformance andfor specialneeds.
CO4	RetrievingthevariousssportssupplementsandErgogenicaidsforthe athletes.
CO5	Applypersonalizednutritionguidanceintheareaofsportsnutrition.

UNITI **15hrs**

- **Nutritional assessment for athletes** - Assessment of body composition, techniquesof measuring body composition, surface anthropometry, Biochemical, clinical anddietaryassessment,Bodycompositionandsportsperformance.
- **Energy requirementsfor optimalathleticperformance-**Energy production,EnergymetabolisminAthletes,Fatigueandexercise,energyrequirementsofathletes,factorsaffectingenergyrequirementsofathletes.

UNITII **15hrs**

- **Carbohydrates in sports performance-** Carbohydrate types, Glycemic index andGlycemic load, carbohydrate utilization during exercise, carbohydrateloading,fuellingbeforeduringandafterexercise,carbohydraterequirements forathletes.
- **Protein and fat requirement for sports performance** - Protein and exercise,requirementsofproteinandfatforathletes, factorsaffectingproteinrequirements.

UNITIII **15hrs**

- **Micronutrients in sports** - Vitamins and Mineral requirements in athletes, sportsanaemia, antioxidantsandexerciseinducedfreeradicals.
- **Hydration for athletes-** Fluid balance and thermoregulation, fluid and electrolyterequirements for athletes, Effects of dehydration, Factors affecting fluid intake,Gastricemptyingandfluiddeliverytoworkingmuscles,Fluidintakebefore,during andafterexercise.

UNITIV **15hrs**

- **Nutritionforcompetitionperformance-**Nutrienttiming,pre-competitionnutritionalguidelines,nutritionduringexerciseandnutritionafterexercise,nutritionplanforspecificsportsevents.
- **Ergogenicaids-**CategoriesofErgogenicaidsandErgolytics.
- **Sportsfoods-**Sportsdrinks,Sportsgels,Sportsenergybars.

UNITV **15hrs**

- **Nutrition for athletes with special dietary needs-** Nutrition for special populationlike children, young and older athlete, Female athlete triad, weight loss and weightgain in athletes, vegetarian athlete, diabetic athlete, athletes with disabilities, factorsaffectingnutritional needsfortravel athlete,GIstressandathletes.

TEXTBOOK:

1. Deakin,Burke.(2006).ClinicalSportsNutrition.McGraw-HillAustralia.3rdedition.
2. Bean,Anit.(2010).ThecompleteguidetoSports Nutrition.A&C.Black.London.6th edition.
3. Bourns,Fred.(2002).EssentialsofSportsNutrition.JohnandWiley.2ndedition.
4. B.Srilakshmi,Suganthi.v,C.KalaivaniAshok.(2017). Exercise physiology fitnessandsportsNutrition,Newagepublishers.1stedition.
5. Benardot,Dan.(2000).AdvancedSportsNutrition.HumanKinetics.

REFERENCES:

1. Burke,Louise.(2007).PracticalSportsNutrition.HumanKinetics.
2. Gleeson,Jeukendrup.(2004).SportsNutrition:AnIntroductiontoEnergyProductionandPerformance.HumanKinetics.
3. SuzanneGirardEberle.(2000).EnduranceSportsNutrition.Human Kinetics.NatalieDigateMuth.(2015).SportsNutritionforhealthprofessionals.Quincy Mcdonald.
4. D.EnetteLarson-Meyer.(1963).Vegetariansportsnutrition.Humankinetics.

E-LEARNINGRESOURCES:

http://ijpnpa.biomedcentral.com
www.acsm.orgwww.ausport.go
vt.auwww.sportsci.orgwww.gssi
web.com

MappingofCowithPSO:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	3	1	2
CO2	2	2	2	3	1	2
CO3	2	3	3	3	1	1
CO4	3	3	3	3	1	1
CO5	2	2	3	3	2	3
Average	**2.2**	**2.6**	**2.8**	**3**	**1.2**	**1.8**

PEDAGOGY

Lecture,Casestudy,journalreviewing,Assignments,Groupdiscussion,Powerpointpresentations.

CORE–IX

TECHNIQUESINFOODANALYSISPRACTICALS

CREDITS:5SEMES
TER:IIIYEAR:II
HOURSPERWEEK:15

OBJECTIVES:

Toenablestudentsto:

1. Learnthetechniquesofestimatingthequantityofdifferentnutrientspresentinfood.
2. Toenablethestudentstogetpracticalexperienceinthelaboratoryanddeveloptheskillsto undertakeresearch work

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethe studentwillbeableto-

CONo.	COSTATEMENT
CO1	Understandsafety rules for the laboratoryanddemonstratevariousinstrumentsused forfoodanalysis.
CO2	Acquireskillstoprepareandstandardisevarioussolutionsto conductexperimentsforfoodanalysis.
CO3	Acquire skillsinashingoffoodsandprepareashsolutionto analysemineralcontentsinfood.
CO4	Demonstratequantitativeanalysisofvariousnutrientsinfoodsi.e. crudefibre,moisture,VitaminC,calcium,phosphorus,iron,etc.
CO5	Demonstrateexperimentstocheckestimationofprotein,fat contentandpigmentanalysis

Unit–I **(15HRS)**

1. **IntroductiontoLaboratoryPractices**
2. **InstrumentalTechniques–**
   - Autoclave
   - HotAirOven
   - pHMeter
   - ElectronicWeighingBalance
   - Centrifuges
   - HotPlate
   - Spectrophotometer
   - WaterBath
   - MuffleFurnace
   - Viscometer

- IRMoistureAnalyzer
- Colorimeter

Unit–II **(8HRS)**

PreparationandStandardisationofSolution

Unit–III **(12HRS)**

AshingofFood(ThermogravimetricMethod)andPreparationofAshSolution

Unit–IV **(25HRS)**

FoodAnalysisExperiments–

Estimationof

- MoistureContent–ThermogravimetricAnalysis-AirOvenMethodandInfraredRadiation(IR)MoistureAnalyzerMethod
- CrudeFibre–GravimetricMethod
- IodineNumberofoils–Wij'sMethod
- AcidNumberofoils-TitrimetricMethod
- PeroxideValueofoils-TitrimetricMethod
- AscorbicAcid–2,6-DichloroindophenolTitrimetricMethod
- Calcium-PrecipitationTitrimetricMethod
- Iron–Wong'sMethod
- Phosphorus–ColorimetricMethod

Unit–V **(15HRS)**

DemonstrationExperiments

- EstimationofproteincontentinfoodbyKjeldahlmethod
- EstimationoffatcontentinfoodbySoxhletmethod
- PigmentAnalysisbyPaperChromatographyTechniques

TEXTBOOKSANDREFERENCES:

- S.SuzanneNielsen(2017).FoodAnalysisLaboratoryManual.SpringerInternationalPublishing.Third Edition.
- S. Suzanne Nielsen (2017). Food Analysis. Springer InternationalPublishing.Fifth Edition.
- Otles,S.(2005)."MethodsofAnalysisofFoodComponentsandAdditives"CRC Press,USA.
- Ranganna,S.(2001)."HandbookofAnalysisand QualityControlforFruitandVegetableProducts".Tata-McGraw-Hill,India. 2nd edition.
- Sadasivam, S and Manickam, A (1997). "Biochemical Methods". New AgeInternationalPublishers,NewDelhi.2nd Edition.

- Jayaram,I,(1996),"LaboratoryManualinBiochemistry",NewAgeInternationalPublishers,NewDelhi.Fifthed.
- Raghuramulu,N,NairK.M&Kalayanasundaram,S.A,(1983),"ManualofLaboratoryTechniques",National InstituteofNutrition,ICMR.

Mapping:(CO/PSO)

CO/PSO	PSO	PSO	PSO	PSO	PSO	PSO
	1	**2**	**3**	**4**	**5**	**6**
CO1	3	2	3	0	3	2
CO2	2	3	3	0	3	1
CO3	2	3	3	0	3	1
CO4	3	3	3	1	3	3
CO5	3	3	3	1	3	3
Average	**2.6**	**2.8**	**3**	**2**	**3**	**2**

PEDAGOGY

Demonstration, Experiments, Activities as assignment, Group Discussion,Observationand Interpretation

CORE–X[INDUSTRYMODULE]

FOODPRODUCTDEVELOPMENT

CREDITS:4SEMES
TER:IIIYEAR:II
HOURSPERWEEK:15

COURSEOBJECTIVES:

Toenablestudentsto:

1. Understandthevariousaspectsoffoodproductdevelopment.
2. Developproductsthatmeetconsumerrequirementsanddemands.
3. Formulateproductsthatarenutritionallyandcommerciallyviable.

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentswillbeableto

CONo.	COStatement
CO1	Applyaproductdevelopmentprocesstogenerateideas,design,developandevaluatenewproductsandtheirmarkets.
CO2	Demonstrateskillintheapplicationofstandardmethodsforthe measurementandevaluationofsensorydifferences.
CO3	Evaluateandanalyzethedifferentfoodpackagingmaterial.
CO4	Reviewtheappropriatelabelingtoadheretostandards.
CO5	Gainknowledgeonpricingandmarketingoffoodproduct

UNITI: (15HRS)

INTRODUCTIONTONEWFOODPRODUCTDEVELOPMENT

- Definition,significanceofproductdevelopment,foodneedsandconsumerpreferences,marketsurveyanddesigningaquestionnairetofindconsumerneedsforaproduct.
- Steps involved in product development, formulation of nutritious food products andstandardization,Factorsthatinfluencenewproductdevelopmentsuccess,Intellectual PropertyRightsandpatentingoffoods.

UNITII: (15HRS)

SENSORYEVALUATIONOFTHEPRODUCT

- Assessingthesensorycharacteristicsoffood-colour,texture,aroma,odorand

taste.Sensoryevaluationoffoods–
Laboratorysetup,equipment,panelselectionandtraining,judgingquality.

- Subjective evaluation techniques – Difference tests: paired comparison test, duo-trio test, triangle test. Rating tests – Ranking single sample, two samples andmultiplesamples.
- Objectiveteststoassessthesensorypropertiesoffoods.

UNITIII: (15HRS)
ESSENTIALSOFFOODPACKAGING

- Importance,definition,principlesdesignrequirementandbasicFSSAIlawsgoverningfood packaging.
- Selection criteria and types of packaging material – metal, glass, paper, plastic,edible,wooden.
- Packageswithspecialfeatures–Boil-in-bagpackage,plastic-shrinkpackage,cryovacfilm,microwaveovenpackaging,asepticpackaginganddistributionpackaging.

UNITIV: (15HRS)
PRODUCTLABELLINGANDREGULATIONS

- Definition,Purpose,Importance,Function,Nutritionalinformationandlawsgoverning productlabelling.
- Typesoflabelling–smartlabels,barcodelabels,radioactivelabels,antimicrobiallabels, securitylabelsandotherspecializedfoodlabels.
- StandardsandregulationsfornutritionharmingandNutritionclaimsinfoodlabels.

UNITV: (15HRS)
QUALITYCONTROL,PRICINGANDMARKETING

- Analyzing the product stability, evaluation of shelf life, determining the changes insensoryattributesduetoenvironmentalconditions.
- Pricingaproduct,Methodsofpricing-costpluspricing,Demandpricing,Competitive pricing, mark up pricing, Principles of pricing, determining the sellingpriceandprofitmargin,pricebundling,promotionalpricingandquantitydiscounts.
- Advertisingandmarketingstrategies-Basictechniques,Foodadvertisingregulations,Marketing mix“fourP’s”

ACTIVITY

Conduct a market survey and develop a new food product based on the needs of yourtarget audience. Conduct sensory analysis tests for the formulated product. Identify asuitable packaging material and design a label for your product. Determine the sellingpriceanddeviseanytwomarketingstrategiestopromoteyourproduct.

TEXTBOOKS:

- ReddySM.(2003).Basicfoodscienceandtechnology.NewAgePublisher,1st edition.

- SubbulakshmiGandUdipiAShobha(2017).Foodprocessingandpreservation.newagepublisher.1stedition.
- ManaySandShadaksharamasamy(2009).Food:FactsandPrinciples.NewAgeInternational(P)PublishersNewDelhi.1st edition.
- AvantinaSharma(2017). Text book of food science andTechnology.CBSOUPublisheresanddistributesltd.3rd edition.

REFERENCES:

- LyonDHandFrancombeMAandHasdellTALawson.(2002).GuidelinesforSensoryAnalysisinFoodProductsDevelopmentandQualityControl .ChepmanandHallLondon.1st edition.
- FullerGW.(1994).NewFoodProductDevelopmentfromConcepttoMarketPlace.RCPressNewYork.2nd edition.
- ManCMDandJomesAA.(1994).ShelfLifeEvaluationofFoods.BlackieAcademicandProfessionalLondon. 2nd edition.
- FrewerLandVanTrijpH.(2007).Understandingconsumersoffoodproducts.FloridaUSACRCPress.1st edition.

ERESOURCES

https://www.fssai.gov.in/

https://nzifst.org.nz/resources/foodproductdevelopmenthttps://nzifst.org.nz/resources/foodproductdevelopment/Chapter-3-1-2.htmhttps://www.fssai.gov.in/

https://theintactone.com/2019/07/23/im-u3-topic-3-packaging-and-labelling/

Mapping:(CO/PSO)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	3	3
CO2	3	2	3	3	3	2
CO3	3	3	3	3	3	3
CO4	3	3	2	3	2	3
CO5	3	3	3	2	3	3
Average	**3**	**2.8**	**2.8**	**2.6**	**2.8**	**2.8**

PEDAGOGY

Lecture,journalreviewing,Projectwork,Groupdiscussion,Powerpointpresentations,Field visit.

ELECTIVE–

VFOODMICROBIOLOGY

CREDITS:3SEMES
TER:IIIYEAR:II
HOURSPERWEEK:15

COURSEOBJECTIVES

- To understand thepracticalskill inhandling microscope and preparationofculturemedia
- ToGainknowledgeofprinciplesofvarioustechniquesofisolationanddeterminatio nofmicroorganismsinfoods
- Toacquirepracticalskillinproductionoffermentedfoods.

COURSEOUTCOMES:

Oncompletionofthecoursethestudentswillbeableto…

CONo.	COStatement
CO1	Gainknowledgeinhandlingofmicroscopeanddevelopbasicskillin cultivationofbacteriawithdifferentculturemedia
CO2	Comprehendinsightonvarioustechniquesofstainingandhanging dropmethodtounderstandthemorphologyof microorganism.
CO3	Evaluateandisolatemicroorganismformdifferentsourceslikeair,wat erandfood.
CO4	Describeand determine the viable count ofmicroorganismfromfoodsamples.
CO5	Understandandapplytheconceptoffood fermentationandisolationoforganismfromfermentedfood

Unit–I **15hours**

Generalmicrobiologyand

1. Cleaningandsterilizationofglasswares.
2. Handlingofhotairovenandautoclave.

3. Usesandstudyofmicroscopes.

UnitII **15hours**

Preparationofculturemediaandtheirsterilization.

Cultivationofbacteria

i) Pourplatemethod.

ii) Spreadplatemethod.

iii) Streakplatemethod

UnitIII **15hours**

StudyofMorphologyofmicroorganism

1. Stainingofbacteria

i) Simplestaining.

ii) Gramstaining.

2. Microscopictestforbacterialmotilitybyhangingdropmethod.

Unit–IV **15hours**

Isolationofmicroorganismsfromdifferentsources

1. Air(Petriplateexposuremethod)
2. Microbialtestingofwater
3. Determinationofmicrobiologicalqualityofmilk

UnitV **15hours**

Determinationofviablecountofmicroorganisms

1. Introductiontocolonycounter
2. Totalplatecount
3. Yeastandmoldcount

ACTIVITY

ProductionandMicrobiologicalexaminationoffermentedfood(Anytwo)

1. Fermentedfruitsandvegetables
2. Fermenteddairyproduct
3. Wineproduction
4. Picklefermentation
5. Fermentedcerealandlegume-basedproduct.
6. Productionofediblemushroom

TEXTBOOKS

1. FrazierW.CandWesthoffD.C.(2013),FoodMicrobiology,TataMcGrawHillPublishingCo.,Ltd.NewDelhi.

2. Annak.Joshua,(2001).Microbiology,PopularBookDepot.Chennai-15.

3. Ray,B.(2001).FundamentalFoodMicrobiology,2ndEd,CRCpress,BocaratonF.

4. JoshiVKandPandey(2004).Biotechnology:food,fermentation,microbiology,biochemistry and technology, Vol I &II, Educational publishers and distributors,NewDelhi.

5. CruegerWandCruegerA(2003)Biotechnology:AtextbookofIndustrialMicrobiology2nd Edition, PanimaPublishingCorpoartion,NewDelhi.

REFERENCEBOOK

1. Guttierrez-Lopez GF and Barbosa-Canovas GV (Eds) (2003) Food Science andFoodBiotechmolgyCRCpress,USA.

2. Halford NG (2003) 'Genetically Modified Crops' Imperial College Press, UKModern Food Micro-Biology by James M. Jay, (2000), 6th edition, An AspenPublication,Maryland,USA.

3. Food Microbiology: Fundamentals and frontiers by M.P. Doyle, L.R. BeuchatandThomaJ. Montville,(2001),2ndedition, ASMpress,USA.

4. MichealPelczar MJ, Chan ECS, Krieg N. (2001) Microbiology. 5th ed. TataMcGraw-HillPublishing Co.Ltd.

5. PrescottLM,HarleyJP,KleinDA.(2008)Microbiology.6thed.WMCBrown

E-LEARNINGRESOURCES:

- Top Microbiology Courses - Learn Microbiology Online | CourseraLearnMicrobiologywithOnlineCoursesandClasses|edX
- 72 Online studies in Microbiology – DistanceLearningPortal.comMicrobiology Free Online Courses and MOOCs | MOOCList(mooc-list.com)
- VirtualMicrobiologyClassroom:8-weekmicrocoursefromScienceProfOnline

Mapping:(CO/PSO)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	1	3	2
CO2	3	3	2	1	3	2
CO3	3	3	2	1	3	2
CO4	3	3	2	1	3	2
CO5	3	3	2	1	3	2
Average	**3**	**3**	**2**	**1**	**3**	**2**

PEDAGOGY(TEACHINGMETHODOLOGY):

GroupDiscussion,Casestudy,seminar,journalreviewing,Assignments,PowerPointPresentations.

SKILLENHANCEMENTCOURSE-II
DIETCOUNSELINGANDTECHNIQUESINNUTRITIONALASSESSMENT

CREDITS:
2SEMESTER:IIIYEA
R:II
HOURSPERWEEK:15

Courseobjectives

Thiscourseaimsto

- Impartthe knowledgeaboutvariousnutritionalassessmenttechniques
- Understandtheconceptofnutritionalstatusanditsrelationshiptohealth
- Tolistoutthestepsindietcounselingprocess.
- Tounderstandandapplythecounselingskillsinestablishingrapportwithpatients.
- Toanalyzethenutritionalneedsofthepatientsafterassessingthenutritionalstatus.
- Toevaluatetheimprovementofthepatientaftercounselling.

CourseOutcome

CONo	CoStatement
CO1	Describesthestepsindietandnutritioncounseling
CO2	Tolearnvariousmethodsofassessmentofnutritionalstatus.Describe,CompareandInterpretthedifferentlevelsofmalnutritioninthecommunity.
CO3	Understandtheconceptofnutritionalstatusanditsrelationshiptohealth
CO4	Usestheskillsinassessmentofnutritionalstatusofnormalanddiseasedpeople
CO5	Relatepracticalskillsindietarycounselingof varioushealthanddiseaseconditions

UNIT-I

- DietCounseling/NutritionCareProcess(NCP)–Definition,importance,purposeandethicalprinciples
- StepsinDietcounselingProcess;Documentation–SOAP
- CounselingSkillsforaDietitian;ToolsofDietitian;
- DifferentCounsellingApproaches– Meaning,Psychoanalytical,behavioural,humanistic,PatientcenteredGALIDRAAapproachesetc.

UNIT-II

- Anthropometricmeasurementofchildren-Height,Weight,MUAC,BMI,Growthchart-plottingofgrowthcharts,growthmonitoringandpromotion.Comparisonwithnormsandinterpretationofthe

nutritionalassessmentdataanditssignificance.Weightforage,heightforage,weightforheight,Zscores,standarddeviations,percentiles.

- Anthropometric Measurement of adults - Height, Weight, BMI, waist circumference, Waist: Hipratio,Waist:Heightratio,skinfoldCallipers,Broka'sindex,Ponderalindex.

UNIT-III

- Biochemical assessment – types, merits and demerits. Nutritional Interpretation of routineMedical Laboratory data- Constituents of common serum chemistry panels, Constituentsofhemogram(completebloodcount),lipidindicesofcardiovascularrisk,chemicaltestsincludedinaurineanalysis

UNIT-IV

- Clinicalassessmentandsignsofnutrient deficiencesspecially PEM(Kwashiorkor,marasmus),VitaminAdeficiencies,Anaemia,Rickets,VitaminBComplexdeficiencies.

UNIT-V

- Dietary assessment. Estimation of food and nutrient intake - Household food consumption data, adultconsumptionunit,24hours'dietaryrecallandrecord,Weighmentmethod,fooddiaries,foodfrequency data, use of each of the above, information available through each individual, collection ofdata,estimationof intakes.

References

1. Srilakshmi,B."Dietetics",8thedition,2018,NewAgeInternationalPublishes,NewDelhi
2. IDA,ClinicalDieteticsManual,2018,2ndeditionElitePublishingHouseNewDelhi
3. CorinneH.Robinson,MarilynR.Lawler,"Normal&TherapeuticNutrition"17thedition1986
4. ShubaginiAJoshi,"Nutrition&Dietetics"5thedition,2022,McGrawhillEducationIndiaPvt.Ltd.
5. JudyGable"CounsellingSkills forDietitians"2ndedition,2007,BlackWell PublishingLtd,Oxford,UK.
6. "Clinical and Therapeutic Nutrition M.Sc." published by directorate of Distance Education, SwamiVivekanandSubhartiUniversity,Meerut,U.P.
7. LindaSnetselaar"NutritionCounsellingSkillsfortheNutritionCareProcess"4thedition,2021,JaneandBartlettPublishers,London.

MappingofCOwithPSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	3	1	3	1
CO2	3	3	3	2	2	2
CO3	3	2	3	3	1	2
CO4	3	3	3	2	2	1
C05	3	2	3	3	3	2
AVERAGE	2.8	2.2	3	2.2	2.2	1.6

KEY: STRONGLY CORELATED-3 MODERATELYCORELATED-2WEAKLYCORELATED-1NOCORELATION-0

SEMESTER-

IVCORE–XI

PUBLICHEALTHNUTRITION

CREDITS:5SEMES
TER:IVYEAR:II
HOURSPERWEEK:15

COURSEOBJECTIVES:

- TounderstandtheconceptofPublicNutrition.
- Toenablestudentstodevelopaholisticknowledgebasedontheimportanceofunderstandingthe nutritionproblemsandtheirprevention.
- Tounderstandthenutritionalproblemsduringtheemergencies/disastersaswellasthestrategies to tacklethem.
- Todevelopskillsinpreparationofcommunication aidsandplanningnutritioneducationprogrammeforthecommunity

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentswillbeableto

CONo.	COSTATEMENT
CO1	Understandtheroleofnutritioninnationaldevelopment
CO2	Acquireskillin assessment ofnutritionalstatusof community.
CO3	Gaindepthknowledgeonstrategiesforimprovingnutritional statusandhealthstatusofthecommunity.
CO4	Evaluatetheroleorganizationincombatingmalnutrition.
CO5	Understandandapplynutritioneducationforthecommunity welfare.

UNITI

CONCEPTOFPUBLICNUTRITION (15HRS)

- NutritionandHealthinNationalDevelopment
- RelationshipbetweenhealthandnutritionNationalHealthCareDeliverySyste m, DeterminantsofHealthStatus,IndicatorsofHealth.
- Nutritionaldeficiencydisordersin India-Prevalence,Etiology,Symptoms,Current statusandRecentupdates-PEM, VADD,IDD, Anemia.
- Nutritionandinfection
- Roleofpublicnutritionistsinthehealthcaredeliverysystem.

UNITII

ASSESSMENTOFNUTRITIONALSTATUS (15HRS)

- **Directmethods:**DirectmethodsofNutritionalassessment,Nutritionalanthropometry,biochemical,clinicalanddietaryassessmentandGrowthcharts -plottingofgrowthcharts,growthmonitoringandpromotion(GMP).
- **Indirectmethods:**Demography,populationdynamicsandvitalhealthstatistics and their health implications. Food balance sheets, recent nutritionalassessment methods- MUST, SGA, SOAP. Indicators of health and nutrition.CausesofMalnutrition-Viciouscycleofmalnutrition
- Basic concepts of Nutritional Surveillance- Millennium Development Goals(MDG)

UNITIII

STRATEGIESFORIMPROVING NUTRITIONSTATUSANDHEALTHSTATUSOFTHECOMMUNITY (15HRS)

- **Immunization**:Awareness,typesofvaccines,ImportanceandscheduleofImmunization.
- **MeasurestoovercomemalnutritioninIndia**
- **Food Security** -Concepts, Meaning and significance, Food security act. Foodfortification and Foodenrichment,Genetic improvementoffoods,Nationalnutritionpolicy andactionplan
- **Nutritioninterventionprogrammes**-MiddayMealProgramme,BalwadiFeedingProgramme.PublicDistributionSystem(PDS),AntyodayaAnnaYojana(AAY),AnnapurnaScheme,FoodforWorkProgramme,SpecialNutritionProgramme.
- **NutritionInterventionSchemesandprogrammesoperatinginIndia-Controlprogrammes -**VitaminA, Anemia,Goiter,Malnutrition.
- Environmentalsanitationandhealth

UNITIV

ORGANIZATIONSTOCOMBATMALNUTRITIONANDNUTRITIONDURINGEMERGENCIESAND SPECIALCONDITIONS(15HRS)

- Internationalorganizationsconcernedwithfoodandnutrition FAO,WHO,UNICEF,CARE,AFPRO,CWS, CRS,WorldBank.
- **National organization** – NIN, CFTRI, ICMR, ICAR, CFTRI, CHEB, NIPCCD,DFRL,NGOs.
- **Nutritionaldeficiencydiseasesinemergencies**-Majorandmicronutrient.Control of communicable diseases in emergencies- Factors responsible for spreadof communicable disease, mode of transmission and prevention of chicken pox,malaria,swineflu,tuberculosis,COVID-19andAIDS.
- Nutritionalrequirementforspacemission,seavoyageandarmy.

UNITV

NUTRITIONEDUCATIONANDEXTENSIONOFBETTERNUTRITION

(15HRS)

- **Nutrition education for the community** –Objectives, Definition and Importanceof nutritioneducationtothecommunity,Principles ofplanning,executingandevaluatingnutritioneducation programmes.
- **Development and Useof AVaids in Public Nutrition Education**.- Charts,flipchart, posters,flannel board, models,OHP.

ACTIVITY

1. Planningandevaluationofnutritioneducationprogrammesincommunity,Preparationofcommunicationaidsfordifferentgroups.
2. Developmentof low-cost recipesfor infants,pre-schoolers,elementaryschoolchildren,adolescents,pregnantand lactatingmothers.
3. Fieldvisitstoongoingnationalnutritionprogrammes.

TEXTBOOKS

1. Park, K. (2013). Text Book of Preventive and Socialmedicine.M/s.BanarsidasBhanotPublishers,Jabalpur.22nd Edition.
2. SuryatapaDas(2020).TextbookofCommunityNutrition.AcademicPublishers,Kolkata.4th Edition
3. Srilakshmi,B(2017).NutritionScience.NewAgeInternationalPublishers.MultiColour6thEdition.
4. Connolly,M.A.(2005).CommunicableDiseaseControlinEmergencies:WHO,WHOLibraryCataloguing-in-Publication Data.
5. WHO(2002).ThemanagementofNutritioninMajorEmergencies.PublishedbyAITBS Publishers,NewDelhi.

REFERENCES

1. MuthuVK (2014).A ShortBookof PublicHealth, JaypeeBrothers MedicalPublishers.2nd edition
2. Dr.SrridharRaoB(2018).PrinciplesofCommunityMedicine,AITBSPublishersIndia.6thedition.
3. ScottM.Smith,SaraR.ZwartandMartinaHeer(2014).HumanAdaptationtoSpace Flight:Theroleof nutrition.NASAPublication.
4. Owen,A.Y.andFrackle,R.T.,(2002).NutritionintheCommunity.TheArtofDeliveringServices.TimesMirror/Mosby.2ndEdition.
5. CarolynD.BerdanierJohannaT.DwyerDavidHeber(2014).HandbookofNutritionandFood,CRCPress,NewYork.ThirdEdition.

ELEARNINGRESOURSES:

https://apps.who.int/irishttp://egyankosh.ac.in/bitstream/123456789/33312/1/Unit-18.pdfhttps://www.seafarerswelfare.org/assets/documents/ship/SHIP-HealthyFood_A5_20151209_LR.pdf

Mapping(CO/PSO):

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	3	3
CO2	3	2	3	3	3	3
CO3	2	3	3	3	3	3
CO4	3	3	3	3	2	3
CO5	3	3	3	3	3	3
Average	**2.8**	**2.8**	**2.8**	**3**	**2.8**	**3**

PEDAGOGY: Lecture,Casestudy,Assignments, Group discussion,Powerpointpresentations.

CORE–XII

ADVANCEDFOODSERVICEMANAGEMENT

CREDITS:5SEMESTER:IVYEAR:II

HOURSPERWEEK:15

COURSEOBJECTIVES:

Thecoursewillenablethestudents:

1. Togainknowledgeanddevelopskillsinmenuplanning,purchasingandstoragepolicies,andquality control inafoodserviceestablishment.
2. Toacquireknowledgeaboutsafetyhygieneandsanitationissuesofafoodserviceestablishment.
3. Tomakestudentsfamiliarwithstandardoperatingprocedures,potentialhazardsinfoodproduction food safetyregulations.

COURSEOUTCOME:

Onsuccessfulcompletionofthecoursethestudentswillbeableto

CONo.	COStatement
CO1	Overviewthefoodservicemanagementandtechniquesof menuplanning
CO2	Acquireskillinpurchasestorageandfoodproduction
CO3	Understand the food management in food serviceestablishment.
CO4	Compiletheworksafetyandlawsgoverning
CO5	Developskillinstartingownfoodserviceestablishment

UNITI

HISTORY, DEVELOPMENT OF FOOD SERVICE SYSTEM, MENUPLANNING(15 hrs)

- Historyanddevelopment,recenttrends,typesoffoodserviceestablishments,commercialestablishments,non-commercialestablishments,understandingmanagement,approachestofoodservicemanagement
- Menu planning – importance, definition, need and function Knowledge and skillsrequiredforplanning menu

Typesofmenuanditsapplications

Stepsinmenuplanninganditsevaluation,constructionofmenu,characteristicsofagoodmenu,displayingamenuandevaluation ofmenu.

UNITII

PURCHASEANDSTORAGE,QUALITYANDFOODPRODUCTION

(15hrs)

- Modeofpurchasing,centralizedpurchasing,grouppurchasing,methodsofpurchasing,identifying needs and amounts to buy, minimum stock level, maximum stock level, receivingandinspecting deliveries
- storagespace,drystorage,lowtemperaturestorage,storeroommanagement
- Productioncontrol,useofstandardizedrecipes,developingaprogramforrecipestandardization,safeguardinfoodproduction,qualitycontrolinfoodpreparationandcooking.

UNITIII

FOODMANAGEMENT:DELIVERYANDSERVICESTYLES (15hrs)

- Methodsofdeliveryservicesystem-centralizeddeliverysystem,decentralizeddeliverysystem, conventional food service system, commissary food service system - ready preparedfoodservicesystem,assemblyservicesystem
- Different types of service in food service establishments- table and counter service, self-service, tray service, types of service in a restaurant, silver service, plate service cafeteriaservice, and buffet service. specialized forms of service, hospital tray service, airline trayservice,railservice,homedelivery,cateringandbanquet,floor/roomservice,loungeservice

UNITIV

PERSONNELMANAGEMENT,WORKPLACESAFETY. (15hrs)

- Definitionof leadership,components approaches,qualities,leadershipstyles recruitment,selectionandinduction,Employeefacilitiesandbenefits,lawsgoverningemployees,workproductivityimprovementmeasures,Traininganddevelopment.

- Hygieneandsanitarypractices,typesofaccidents,precautionstopreventaccidents,Garbageand refuse sanitation- inside and outside storage , Pest control- pests, signs of infestation andIntegratedPestManagement(IPM) Lawsgoverningfoodserviceestablishment.

UNITV

SETTINGUPANDPLANNINGFOODSERVICEUNIT (15hrs)

- Layout and design – Phases of planning layout-developing a prospectus, Determiningworkcentersequipment,Factorsinfluencinglayoutdesign,Architecturalfeatures, evaluationofplan,Energyandtimemanagement.
- Planning- steps and types of planning, Preparing a planning guide , Registration of unit ,Applicationforalicence,Rulesregardinggradingofhotelsandrestaurants,Loanfacilitiesforstartup .

TEXTBOOKS

- BessieBandWestLeWood(1986).FoodServiceinInstitutions(6thEd.)MacmillanPublishing Co.
- MohiniSethi(2008).InstitutionalFoodManagement,Newagepublications,NewDelhi
- JunePayne-Palacio,MonicaTheis.(2011). FoodserviceManagement:PrinciplesandPractices,PrenticeHall
- SudhirAndrews(1997).ëFoodandBeverageService-TrainingManualí,23rdReprint,TataMcGrawHillPublishingCo.

- Foodservicemanagement(2017)VSuganthiandCPremakumari.

REFERENCES

- MohinderChand,ManagingHospitalityOperations,2009,1stEdition,AnmolPublicationsPvt.Ltd.NewDelhi.
- GoelS.L,HealthCareSystemand HospitalAdministration,2009,Vol.7,DeepandDeepPublicationsPvt.Ltd.
- KalkarS.A,HospitalInformationSystems,2010,PublishedbyAsokeK.Ghosh,PHILearning Pvt.Ltd.
- ShringY,P.EffectiveFoodServiceManagement,AnmolpublicationsPvtLtd,NewDelhi,2001.3.
- Stephen,B,,Williams,S,R,"BillJardine,andRichard,J,N,IntroductiontoCatering,
- IngredientsforSuccess,Delmar-Thomsonlearning,2001.
- Yadav,C,P.ManagementofHotelandCateringIndustry,AnmolpublicationsPvt

ELEARNINGRESOURCES

https://seafoodacademy.org/pdfs/haccp-training-folder-contents-v2.pdfhttps://psu.pb.unizin.org/hmd329/chapter/ch4/https://www.plantautomation-technology.com/articles/types-of-food-processing-equipmenthttps://dmi.gov.in/GradesStandard.aspxhttps://www.fssai.gov.in/cms/food-safety-and-standards-regulations.php

Mapping:(CO/PSO)

CO/PSO	PSO 1	PSO 2	PSO 3	PSO4	PSO5	PSO6
CO1	3	3	2	3	3	3
CO2	3	3	3	3	2	3
CO3	3	3	2	3	3	3
CO4	2	3	3	3	3	3
CO5	3	3	3	3	3	3
Average	**2.8**	**3**	**2.6**	**3**	**2.8**	**3**

PEDAGOGY: Lecture, Casestudy,Assignments, Groupdiscussion,Powerpointpresentations,Field visit

ELECTIVE-
VIENTREPRENEURIALDEVELOPMENT

CREDITS:3
SEMESTER:IVYEA
R:II
HOURSPERWEEK:15

COURSEOBJECTIVES
Toenablethestudentsto

1. Understandbasicconceptsinentrepreneurship.
2. AcquireknowledgeaboutthevariousEntrepreneurialdevelopmentagencies.
3. Adoptkeystepsintheelaborationofbusinessideas.
4. Understandmajorstepsinvolvedinsettingupa Small-ScaleUnit.
5. HighlighttheLegislationprocessandLaborLawsApplication.

COURSEOUTCOMES
Onsuccessfulcompletionofthecoursethestudentswillbeableto

CO	COSTATEMENT
CO1	Discerndistinctentrepreneurialtraits.
CO2	Explainbusinessideagenerationtechniques,Evaluateparameterstoassessopportunities andconstraintsfornewbusinessideasanddeviceabusinessplan. DiscussownershipsandSHG
CO3	Explainfinancial,workingcapitalandmarketingmanagement
CO4	IdentifyandincludeMajorstepsinvolvedinsettingupaSmall-ScaleUnitElaborate ExportMarketingprocedures&formalitiesandlearnaboutPatents&IPRs
CO5	AnalyzeLegislationprocessandexplaintheLaborLawsApplication

UnitI
Entrepreneurship–Basicconcepts

Entrepreneurship–Definition,Importance,Challengesanditsrelevanceincareergrowth Startups India–Incubation Centre-Digital entrepreneurship & Social entrepreneurship,Entrepreneur-Meaningand Characteristics.

UnitII
BusinessIdeaandSelf-HelpGroups

BusinessIdeaGenerationTechniques–IdentificationofBusinessOpportunities Ownership-partnership,soleproprietorship,franchise,cottageindustries,self-employmentSHG– Meaning,ImportanceandGovernmentAssistance

UnitIII
FinancialandMarketingManagement

Financial Management - Books of Accounts, Financial Statements,Working Capital Management – Factorsandsources,Break-EvenAnalysisMarketingManagement-MarketingMix- Product,Promotion,Place&Price.

UnitIV

SettingupaSmall-ScaleUnit

Major steps involved in setting up a Small - Scale Unit Financial support from Financial Institutes - National level -NBMSME, KVIC, DC-MSME, NSIC, NSTEDB, EDI, NI-MSME, NIESBUD, IIE,NABARD

State level - DIC, SFC,SIDC, SIADB, SIDBI, Export Marketing- procedures &formalitiesInventoryManagement&TQMBasicconceptsPatents&IPRs

UnitV

LegislationFormalities

Legislation - Licensing, Registration, Municipal Laws, Business Ethics Labor Laws Application,ConsumerComplaintsandRedressalTax–GSTanditsimplication.

REFERENCESBOOK S

- Saravanavel,(2005),EntrepreneurialDevelopment,EssPeeKeyPublishingHouse,Chennai
- VasantDesai,(2004),ProjectManagement,HimalayaPublishingHouse.
- Holt(2009),Entrepreneurship,Newventurecreation.
- S.SainiandS.K.,Dhameja,(2011),EntrepreneurshipandSmallBusinessRawartNewDelhi.
- C.Jain,(2012),Handbook forNewEntrepreneurs,OxfordUniversityPress.

E-LEARNINGRESOURCES

- http://www.ddegjust.ac.in/studymaterial/mba/cp-401.pdf
- https://ecestudy.files.wordpress.com/2015/02/theories-of-entrepreneurship.pdf
- http://www.bimkadapa.in/materials/ED-5-UNITS-PDF.pdf
- https://www.theseus.fi/bitstream/handle/10024/115894/Laamanen_Pirita.pdf?sequence=1&isAllowed=y
- https://bbamantra.com/preparation-of-a-business-plan/
- https://courses.lumenlearning.com/boundless-business/chapter/introduction-toentrepreneurship2.http://www.rroij.com/open-access/women-entrepreneurs--problems-ofwomenentrepreneurs-.php?aid=48589–3.http://www.mbaexamnotes.com/business_idea.html
- https://www.businessstudynotes.com/finance/project-management/types-feasibility.

MAPPINGOFCOWITHPSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	W	M	W	M	S
CO2	M	S	S	S	S	S
CO3	M	M	M	M	S	S

CO4	M	M	S	M	S	S
CO5	M	S	S	S	S	S

SKILLENHANCEMENTCOURSE[SEC]-

IIIFUNCTIONALFOODSANDNUTRACEUTICALS

CREDITS:2SEM
ESTER:IVYEAR
:II
HOURSPERWEEK:15

CourseObjectives

- To gain knowledge about functional foods and Nutraceuticals
- To have thorough understanding about the health effects
- To be familiar with applications inindustry.

COURSEOUTCOMES
Onsuccessfulcompletionofthecoursethestudentswillbeableto

CO	COSTATEMENT
CO1	**Describe about source, chemistry and uses of several natural Nutraceuticals.**
CO2	**Describe occurrence, chemical nature and medicinal benefits of natural Nutraceuticals belong to different phytochemical categories.**
CO3	**Explain about different free radical which generate in body and their effects and different dietary fibres and complex carbohydrate as functional food ingredients**
CO4	**Explain the role of free radicals in development of different diseases and aging**
CO5	**Explain the role of natural and synthetic antioxidants, functional foods in prevention of chronic diseases.**

UNITI

Introduction- Functionalfoods andnutraceuticals-Introduction,definition,importance,Healthattributes of functional foods– Introduction, Health living Index provides information on healthydiet.

UNITII

FFNandprobiotic-PrebioticandProbioticimmunesystem,sourcesofmicroalgalhealthsupplements.

Colonic Functional Foods: Introduction, Metabolism, Probiotics, Symbiotic, Healthaspectsoffunctional colonicfoods,Host–microbeinteraction,treatmentofGItractdisorders

UNITIII

Phytochemicals - Introduction–Terpenoids, Polyphenolics, Anthocyanins, Isoflavones, Silymarin,Tangeretin,Saponins,Otherdominantphytochemicals.

UNITIV

Other Nutraceuticals - Source, natural constituents of animal and vegetable lipids, functions ofPUFAs.Functionalfoodsinthecontrolofaging,moodandperformance

UNITV

Nutraceuticals in medical foods - Anti – Tumor properties: Nature of tumour growth, mode ofcarcinogenesis,Dietandgene interactions,Mechanismsof action,Nutrients& theirroleoffunctionalfoods

REFERENCE:

1. MaryK.SchimslandTheodreP.Labuza;Essentialsoffunctionalfoods2000,CulinaryandHospitalityindustryPublicationServices
2. C.RemacleandB.Reusens,FunctionalFoods,AgingandDegenerativeDiseases,Culinary &HospitalityPublicationsServices.

MappingCOwithPSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	2	3	3	2
CO3	3	3	2	3	3	2
CO4	3	3	1	3	3	1
CO5	3	3	2	3	3	2
Average	3	3	2	3	3	2

StronglyCorrelated(3);ModeratelyCorrelated(2););WeaklyCorrelated(1);NoCorrelation(0)