THE GANDHIGRAM RURAL INSTITUTE - DEEMED TO BEUNIVERSITY
MINISTRY OF EDUCATION (SHIKSHA MANTRALAYA), GOI
ACCREDITED BY NAAC WITH 'A' GRADE (3rd Cycle) GANDHIGRAM - 624302,
DINDIGUL DISTRICT, TAMIL NADU

B.VOC FOOD PROCESSING SYLLABUS
(With effect from September 2021)
DDU – KAUSHAL KENDRA GANDHIGRAM -624302

Scheme of syllabus for DDU-KK- UGC B.Voc. Food Processing Degree Programme

Semester I

Category	Course Code	Title of The Course	Theory	Practical	Credits	Marks Distribution			
						CFA	ESE	Total	
General components (A)	**21ENGU01F1**	Foundational English I	3	-	3	40	60	100	**NSQF level 4** **Pulse Processing Technician FIC/Q1004**
		Yoga	-	1	1	50	-	50	
	21FPRV0101	Food Commodities	4	-	4	40	60	100	
	21FPRV0102	Environmental science	4	-	4	40	60	100	
	Total =		**11**	**01**	**12**	**170**	**180**	**350**	
Skill components (B)	**21FPRV0103**	Fundamentals of Food and Nutrition **(P)**	-	5	5	60	40	100	
	21FPRV0104	Food Chemistry **(T)**	2	-	2	50	-	50	
	21FPRV0105	Food Chemistry**(P)**	-	3	3	60	40	100	
	21FPRV0106	Cereals, Pulses & Oilseeds Processing	3	-	3	40	60	100	
	21FPRV0107	Cereals, Pulses & Oilseeds Processing **(P)**	-	3	3	60	40	100	
	21FPRV0108	Internship	-	2	2	50	-	50	
	Total =		**05**	**13**	**18**	**320**	**180**	**500**	
		Grand Total (A+B)			**12+18 = 30**	**490**	**360**	**850**	

Semester II

Category	Course Code	Title of The Course	Theory	Practical	Credit	Marks Distribution			
						CFA	ESE	Total	
	21ENGU02F2	Foundational English II	3		3	40	60	100	**NSQF Level 5** **Plant Baker FIC/ Q5001**
	21CSAV0201		-	4	4	60	40	100	
General Components (A)	**21FPRV0209**	Unit operations in food processing **(P)**	-	5	5	60	40	100	
		Total =	**03**	**09**	**12**	**160**	**140**	**300**	
Skill Components (B)	**21FPRV0210**	Grain Milling Technology	3	-	3	40	60	100	
	21FPRV0211	Grain Milling Technology **(P)**	-	3	3	60	40	100	
	21FPRV0212	Bakery and Confectionary Products	3	-	3	40	60	100	
	21FPRV0213	Bakery and Confectionary Products **(P)**	-	3	3	60	40	100	
	21FPRV0214	Technology for convenience foods **(P)**	-	4	4	60	40	100	
	21FPRV0215	Internship		2	2	50	-	50	
		Total =	**06**	**12**	**18**	**310**	**240**	**550**	
		Grand Total (A+B) =			**12+ 18= 30**	**470**	**380**	**850**	

Semester III

Category	Course Code	Title of The Course	Theory	Practical	Credits	Marks Distribution			
						CFA	ESE	Total	
General Component (A)	**21FPRV0316**	Food Quality Evaluation **(P)**	-	3	3	60	40	100	
	21FPRV0317	Personality Development	3	-	3	40	60	100	
	21FPRV0318	Food Preservation-Principle & Practices	3	-	3	40	60	100	
	21FPRV0319	Food Preservation-Principle & Practices(**P)**	-	3	3	60	40	100	
	Total =		**06**	**06**	**12**	**200**	**200**	**400**	
Skill Component (B)	**21FPRV0320**	Dairy Processing (T)	5	-	5	40	60	100	
	21FPRV0321	Food Laboratory and Safety Practices	3	-	3	40	60	100	
	21FPRV0322	Food Laboratory and Safety Practices **(P)**	-	3	3	60	40	100	
	21FPRV0323	Food Packaging (T)	3	-	3	40	60	100	
	21FPRV0324	Processing of sugar, salt, and jaggery	2	-	2	50	-	50	
	21FPRV0325	Internship	-	2	2	50	-	50	
	Total =		**13**	**05**	**18**	**280**	**220**	**500**	
	Grand Total (A+B) =				**12+18 = 30**	**480**	**420**	**900**	

Semester IV

Category	Course Code	Title of The Course	Theory	Practical	Credits	Marks Distribution			
						CFA	ESE	Total	
General Component (A)	**21CSAV0402**		-	4	4	60	40	100	
	21GSPSU001	Gandhi's Life Thought and Work	2	-	2	20	30	50	**NSQF Level 6** **Quality Assurance Manager (FIC/Q7602)**
	21FPRV046	Milk product technology	3	-	3	40	60	100	
	21FPRV047	Milk product technology (P)	-	3	3	60	40	100	
		Total =	**08**	**04**	**12**	**180**	**170**	**350**	
Skill Component (B)	**21FPRV048**	Food Analysis and Quality Testing	4	-	4	40	60	100	
	21FPRV049	Food Analysis and Quality Testing (**P)**	-	4	4	60	40	100	
	21FPRV0430	Food Microbiology (T)	2	-	2	50	-	50	
	21FPRV0431	Food Microbiology (**P)**	-	3	3	60	40	100	
	21FPRV0432	Food Quality Assurance	3	-	3	40	60	100	
	21FPRV0433	Internship	-	2	2	50	-	50	
		Total =	**09**	**09**	**18**	**300**	**200**	**500**	
Grand Total (A+B)					**12+18 = 30**	**480**	**370**	**850**	

Semester V

Category	Course Code	Title of The Course	Theory	Practical	Credit	Marks Distribution		
						CFA	ESE	Total
General Component (A)	**21FPRV0534**	Food Business Management	3	-	3	40	60	100
	21FPRV0535	Entrepreneurship Development	3	-	3	40	60	100
	21FPRV0536	Computer applications in food Industry (P)	-	3	3	60	40	100
	21FPRV0537	Postharvest technology of fruits and vegetables **(P)**	-	3	3	60	40	100
		Total =	**06**	**06**	**12**	**200**	**200**	**400**
Skill Component (B)	**21FPRV0538**	Fruits and Vegetables Processing	3	-	3	40	60	100
	21FPRV0539	Fruits and Vegetables Processing **(P)**	-	4	4	60	40	100
	21FPRV0540	Drying Technology (**P**)	-	3	3	60	40	100
	21FPRV0541	Novel Food Processing Technologies	3	-	3	40	60	100
	21FPRV05E1 / E2/E3	Elective	3	-	3	40	60	100
	21FPRV0542	Internship		2	2	50	-	50
		Total =	**09**	**09**	**18**	**290**	**260**	**550**
		Grand Total (A+B) =			**12+18 = 30**	**490**	**460**	**950**

Semester VI

Category	Course Code	Title of The Course	Theory	Practical	Credits	Marks Distribution			
						CFA	ESE	Total	
General Component (A)	**21FPRV0643**	Food Hygiene and Safety	3	-	3	40	60	100	**NSQF Level 7** **Production Manager FIC/Q9003**
	21FPRV0644	Food Plant Maintenance and Management	4	-	4	40	60	100	
	21FPRV0645	Project Preparation and Management	4	-	4	40	60	100	
	21FPRV0646	Online Swayam portal	1	-	1	-	-	-	
	Total =		**12**	**-**	**12**	**120**	**180**	**300**	
	21FPRV0647	Food product development	2	-	2	50	-	50	
	21FPRV0648	Project work	-	14	14	100	75+25 =100	200	
	21FPRV0649	Internship	-	2	2	50	-	50	
	Total =		**02**	**16**	**18**	**200**	**100**	**300**	
Grand Total (A+B)					**12+18 = 30**	**320**	**280**	**600**	

FIRST SEMESTER

FOUNDATIONALENGLISHI

Code:21ENGU01F1 Credit:3+0 ContactHours/Week:3 Marks:100

FOOD COMMODITIES

Code:21FPRV0101 Credit:4 ContactHours/Week:4 Marks:100

Course Objectives:

- Toknowaboutthecommoditiesderivedfromplantsand animals
- Toprovideknowledgeonnutritivevalueoffoodcommodities
- Toillustratetheimportanceofprocessing thefoodcommodities

SpecificLearning Outcome:

After completionofthiscourse,thestudentswill beableto

- Identifythefoodsfromplantandanimalsources
- Select foodsrichinnutrients forpreparationofnovel foods
- Categorizethefoodsbasedonitsshelflife

UNITIScienceofFood

Food meaning and its function, food composition, food groups, food production around theworld and India, Food demand and supply, food wastage.

Globalagriculturalproduction.

UNITIIFoodCommodities-Plant foodsIand II

Cereals:rice,wheat,maize,barleyoats&ryenutritivevalue,nutritivevalueofmillets: sorghum, cumbu, ragi, thinai etc., pulses and legumes types and nutritive value

Classificationofvegetables-leaf,roots&tubersandothers,nutritivevalueofvegetables, Classification of fruits-climatric& non-climatric, nutritive value of fruits.

Chengesduring maturation,ripening,postharvestandstorageonpigments,browning.

UNITIIIFoodCommodities– AnimalFoods

Milk,Meat,Fish,Egg-source,typesandnutritivevalue.Production,consumptionpatternaround the world.

UNITIVFoodCommodities–miscellaneousFoods

Spices: source,type and nutritive value, sugar: sourcesand types, manufacture, application infood preparation, sweetening agents, artificialsweeteners,nutritive value, fat andoil: source, type and nutritive value.

UNITVFoodCommodities:-GMF

Geneticengineeringprocess,genetechnology,recombinantDNATechnology

RELATEDEXPERIENCES

1. Plotafoodpyramidusinglocallyavailablefoodingredients
2. Surveytheavailabilityofcerealsinthemarket
3. Collectanddisplaypulsesandlegumes
4. Identifythegreenscultivatedinthelocalarea
5. Collectfruitsavailable inthe localmarketandcategorizeit
6. Surveyontypeofmeatandfishesavailableinthemarket
7. Surveyonspicesandherbscultivatedin localarea
8. Surveyontypes ofsugarandevaluate its quality
9. Surveyonvegetableoiland/fatavailableinthemarket
10. Visittograin market
11. Visit tofruitsand vegetable market
12. Visittospiceprocessingunit,dairyindustry,oilmills,sugarmill
13. GMOcropspreparingunit-canola oil,soybeanoilindustry
14. Visittoflavourextractionunits
15. Plantation–organicvariety

TEXTBOOK

1. Srilakshmi,B.(2003), "FoodScience", NewAgeInternationalPublishers, New Delhi
2. Potter,N.M.andBirch,G.G.(1986).FoodScience, AVI, WestPort,Conn.
3. Swaminathan,M.(1988).FoodScienceandExperimentalFoods.Madras:Ganeshand Company.

REFERENCEBOOK

1. FrancisFJ.2000.WileyEncyclopediaofFoodScience& Technology.JohnWiley&Sons.
2. Manay,N.S.Shadaksharaswamy,M.(2004),"Foods-FactsandPrinciples",Newage international publishers, New Delhi.
3. Gopalan,C.,RamaSastri,B.V.,Balasubramanian,S.C.,NarasingaRao,B.S.,Deosthale, Y.G.,&Pant,K.C. 2012.NutritivevalueofIndianFoods, NationalInstituteofNutrition, ICMR, Hyderabad, India.

WEBOGRAPHY

1. https://egyankosh.ac.in/bitstream/123456789/11694/1/Unit-1.pdf
2. http://lib.rudn.ru/file/Food_Science_Nutrition_Catalogue_ebook.pdf
3. https://www.slideshare.net/RoshinaRabail/introduction-to-food-science-and-technology-101
4. https://www.slideshare.net/partharoychaudhry/cereals-pulses-36867856

5. https://slideplayer.com/slide/14016092/
6. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=147675

ENVIRONMENTALSCIENCE

Code:21FPRV0102 Credits:4 Hours/week:4 Marks: 100

Course Objectives:

- Toimpart theknowledgeonenvironmentalandnaturalrecourses.
- Tostudyabouttheimpactofpollution,socialissuesanddisaster management.
- Toobtainthe briefknowledge onEcosystemandits functions.

SpecificLearning Outcome:

After learning this paper the students will gain knowledge in solid waste, waste water and disaster managementand preventiontechniques ofdeposition ofhazardous materials on land.

UNITI

Introduction - environmental ethics- applied physiology- conceptual foundation ofenvironmentalvalues-assessmentofsocio-economicimpact–environmentaudit-mitigationof adverse impact on environment - importance of pollution control-types of industries and industrial pollution.

UNITII

Solidwastemanagement-characteristicsofindustrialwaste-methodsofcollection,transferand disposal of solid wastes-converting waste to energy-hazardous waste management treatment technologies.
Types of solid waste disposal- landfilling, incineration, recycling, composting,waste-toerergy, hazardous waste treatment, source reduction, biogas generation

UNITIII

Waste water management-characteristics of industrial effluents-treatment and disposal methods-pollution of water sources and effects on human health.

UNITIV

Air pollution management- sources and effects–dispersion of air pollutants-air pollution control methods-air quality management; noise pollution management–effects of noise on people, noise control method- active – passive methods.
Hierarchyofcontrols-elimination, substitution, engineeringcontrols, administrativecontrols,PPE.

UNITV

Disaster management-meaning, concepts, causes and types, effects ofdisaster on community economyandenvironment,disastermanagementcycle,responserehabilitation,reconstruction, role of community in disaster.
NationalDisastermanagementauthority-NDMA-Apexbody.
State Disaster management authority- SDMA

TEXTBOOKS

1. Agarwal,K.C.2001EnvironmentalBiology,NidiPubl.Ltd. Bikaner.
2. BharuchaErach,The Biodiversity of India,Mapin Publishing Pvt.Ltd.,Ahmedabad 380013, India, Email: mapin@icenet. net (R).

REFERENCEBOOKS

1. BrunnerR.C., 1989,HazardousWasteIncineration, McGrawHillInc. 480p.
2. ClerkB.S.,MarinePollution,ClandersonProssOxford(TB).

WEBOGRAPHY

1. https://vardhaman.org/wp-content/uploads/2019/10/ENVIRONMENTAL-SCIENCE-1.pdf
2. https://elaw.org/system/files/Chapter%208%20Disaster%20Management.pdf
3. https://ec.europa.eu/echo/files/evaluation/watsan2005/annex_files/WEDC/es/ES07CD.pdf
4. http://rcueslucknow.org/publication/TrainingModules/Dr.A.K.Singh/HandBookDisaster Management.pdf
5. https://www.iloencyclopaedia.org/part-vii-86401/environmental-pollution-control/item/507-air-pollution-management

FUNDAMENTALSOFFOODAND NUTRITION

Code:21FPRV0103 Credit:5 ContactHours/Week:5 Marks:100

Course Objectives:

- Toknowaboutthefoodtypesandits origin
- Tounderstandthesciencebehindfoodpreparations
- Tosignifythe roleoffoodinhealthand wellbeing

SpecificLearning Outcomes:

After completionofthiscourse,thestudentswill beableto

- Relatefood,nutrientsandhealth
- Chooseappropriatecookingmethodforfood preparation
- Suggestmethodtoreducelossofnutrientsduringprocessing.

UNITIIntroductionto food

Classificationoffoodsbasedontheorigin,foodconcepts:healthyfoods,ethnicfoods,organic foods, functional foods, nutraceuticals, fabricated foods, extruded foods, convenience foods, junk foods, GM foods.

UNITIIFoodpreparations

Basic operations like cleaning, peeling, cutting, blanching etc advantages and limitations, cooking meaning, objectives of variouscooking methods: wet and dry, advantages and limitations, use ofmicrowave and solar cooker.

UNITIIIHuman nutrition- Macronutrients:

Nutritiondefinition,macronutrients:carbohydrates,proteins,lipidsandroleofwater, requirement and deficiencies.

Methodsofqualitativeanalysis.

UNITIVHuman nutrition-Micronutrients:

IntroductiontoMicronutrients:Vitamins&minerals-functions,requirementsanddeficiencies

UNITVEnergybalance

Energymeaning,unit ofmeasurement,energybalanceandenergycomponents. Energy

homeostasis- homeostatic control of energy balance.

Practical

1. Surveyontypesoffood productsavailableinthe market
2. Collectionofdataontypeofconveniencefoodsavailable.
3. Exerciseonblanchingofvegetablesandfruits
4. Experimentsondifferenttypesofcookingmethodsandstandardization.
5. Qualitativetestforcarbohydrate,proteinand lipidpresentinfood
6. Groupthefoodingredientsbasedoncarbohydrate,proteinandlipidcontent
7. Groupthe foodsbased onvitamincontent
8. Groupthefoodingredientsbasedon mineralcontent
9. Calculateenergyvalueof foods
10. Computeenergyrequirementofanindividual

TEXTBOOK

1. Srilakshmi, B. (1997).FoodScience.NewDelhi:Chennai:New AgeInternationalPrivate Limited. Publishers.

2. Mudambi,R.S.andRajagopal,M.Y.(1991). FundamentalsofFoodandNutrition. NewDelhi: Wiley Eastern Limited.

3. Swaminathan,M.(1988).FoodScienceandExperimentalFoods.Madras:Ganeshand Company.

4. Bennion,et.al.(1985).IntroductoryFoods.NewYork:Macmillan.

REFERENCEBOOK

1. JanetD.Ward.&LarryWard(2015).PrinciplesofFoodScience,4th edt. GoodheartWillcox Company Inc.
2. Srilakshmi,B.(2008).NutritionScience.NewAgeInternationalPublishers,NewDelhi.
3. Potter,N.N.andHotchkiss,J.H.(1996).FoodScience,edition5,CBSPublishersand Distributors, New Delhi.

WEBOGRAPHY

1. https://www.brainkart.com/article/Classification-of-Food_37944/
2. https://www.bngkolkata.com/pre-preparation-of-food/
3. https://www.britannica.com/science/human-nutrition

FOODCHEMISTRY(T)

Code:21FPRV0104 Credit:2 ContactHours/Week:2 Marks:50

Course Objectives:

- Toprovideknowledgeonfoodconstituentsandits physicalandchemicalproperties
- Tounderstandthechanges infoodqualityduetoprocessingconditions

SpecificObjectivesof Learning:

Aftercompletingthiscoursestudentswill beableto

- describethegeneralchemicalstructureofmajorcomponentsoffoods(water,carbohydrates, protein and lipids)
- explain howchangesinoverallcompositionare likelyto changethereactivityoffoodcomponents.
- predicthowprocessingconditionsarelikelytochangethereactivityoffoodcomponents.

UNITIFood Composition and Water

Introductiontofoodchemistry,foodcomposition –water,carbohydrate,protein, fat,pigment,colours, flavours etc. Water: Structure, hydrogen bonding, effect ofhydrogen bonding ontheproperties of water, moisture content of foods, free water, bound water, water activity.

UNITIICarbohydrates

Nomenclature, composition, structure, classification - monosaccharide, disaccharides,oligosaccharides and polysaccharides, properties and food sources. Starch – composition,structure and properties, concept of gelatinisation, dextrinisation, retrogradation.

UNITIIIAmino Acids&Proteins

Nomenclature, composition, structure, classification, properties of amino acids. Proteins:structure,classification,properties(physiochemicalandfunctional)changesinproteinsduringprocessing.

UNITIV Fatsand oils

Nomenclature, composition, structure, classification, physical and chemical properties - hydrolysis, hydrogenation, rancidity and flavour reversion, emulsion and emulsifiers,saponification value, acid value and iodine value, smoke point.

UNITVEnzymes, pigments,flavoursinfood

Enzymes – meaning and importance, classification, factors influencing enzymatic activity,quality changes due to enzyme action, enzymatic browning and method of control, enzymesadded to food during processing. Pigments meaning, classification, properties, effect ofprocessing and storage, flavours-composition, properties, effect of processing on flavourcomponents.

FOODCHEMISTRY(P)

Code:21FPRV0105 Credit:3 ContactHours/Week:3 Marks:100

Course Objectives

- Toimparttheknowledgeaboutthechangeshappenintheconstituentsoffoodwhile cooking
- Toknowthe propertiesoffoodqualitybothpreand postprocessing

Practical

1. Determinationofmoisturecontentofdifferentfoods
2. EstimationofaWoffoods
3. Examinationthestarchstructurebymicroscope
4. Demonstratethechangesinstarchpropertiesdueto heat,acid,alkaliand alcohol
5. Analyzethefunctionalpropertiesofproteins
6. Studythephysiochemicalpropertiesofproteins-amphoteric ionization, isoelectricpoint,colour reaction, salt reaction.
7. Estimationofacid value ofoil/fat
8. Determinationofperoxidevalueofoil
9. Exercisethemethodsusedto prevent enzymatic browning
10. Studytheeffectofheat,acid,alkalion fruit/vegetable pigments

TEXTBOOK

1. Meyer,L.H.(2002), "FoodChemistry". CBSpublishersandDistributors,NewDelhi.

2. Manay,N.S.Shadaksharaswamy,M.(2004),"Foods-FactsandPrinciples",Newage international publishers, New Delhi.

3. SeemaYadav,(1997).FoodChemistry,AnmolPublicationsPvt.Ltd.,NewDelhi.

REFERENCEBOOK

1. Damodaran,S.,Parkin,KL.,Fennema,OR.,(2008),"Fennema'sFoodChemistry"-4th edition, CRC press, New York.

2. Yildiz,Fatih(2009),"Advances inFoodBiochemistry",CRCPress,NewYork.

`

WEBOGRAPHY

1. https://www.slideshare.net/mobile/anjalikotwal1/a-nalysis-of-fat-and-oil
2. https://www.slideshare.net/mobile/sanjaijosephManesh/food-chemistry-51688453
3. https://people.umass.edu/~mcclemen/581Introduction.html
4. https://www.slideshare.net/mobile/MuhammadNaveedLaskan/food-and-water-food-chemistry-constituent-of-foods-ie-water-carbohyfrate-lipid-protein-vitamin-inorganic-material-other-substances-physical-property-of-water
5. https://www.slideshare.net/mobile/iska84anne/starch
6. https://www.uswatersystems.com/deionized-water-vs-distilled-water#:~:text=Deionized%20(DI)%20water%20is%20water,condensed%2C%20leaving%20most%20impurities%20behind.
7. https://www.slideshare.net/mobile/MsKPetty/protein-30986641
8. https://www.slideshare.net/mobile/SaifulIslam750/carbohydrates-and-its-classification
9. https://www.slideshare.net/mobile/MohamedHassanien/food-proteins

CEREALS,PULSESANDOILSEEDSPROCESSING

Code:21FPRV0106 Credit:3+0 ContactHours/Week:3 Marks:100

Course Objectives:

• Tocreateawarenessabouttheprocessingofcereals,pulsesand oilseeds.
• Tostudythestorageandhandlingpracticesofcereals,oilseedand pulses.
• Togainknowledgeonprocessingandmillingofcereal,pulsesandoilseeds.

SpecificObjectivesof Learning

Aftercompletingthiscoursestudentswill beableto

- knowaboutthepostharvesttechnologiesforcereals,pulsesand oilseeds
- explainthe lossofnutrientsduetovariousprocessing methodsadoptedforcereals,pulses and oilseeds
- familiarwiththeprocessandproductionofvalueaddedproductsfromcereals, pulsesand oilseeds.

UNITIMajorCerealsProcessing

Postharvesttechnologiesformajorcereals,parboilingandmillingofmajorcereals,processed products; effect of processing on nutritive value.

Majormanufacturingprocesses-cooking,tempering,puffing,flaking,shredding,baking,flavourings, nutrients.

Ready- toeatcereals- extrusionprocess.

UNITIIMinorCereals(Millet)Processing

Postharvesttechnologiesformillets,Processingandvalueadditionofmillets,effectof processing on nutritive value of millets.

Valueaddition- pastaproducts,flakedandpoppedproducts,instantfoodmixes.

UNITIIIPulses Processing

Post harvest technologies for pulses; milling of pulses- soaking, germination, decortication,cooking, fermentation. antinutritional factors in pulses and the methods used for destruction/elimination; processed pulse products; effect of processing on nutritive value of pulses.

Valueaddition-starchrichpulseflour, proteinconcentrates,protein isolates.

UNITIVNutsProcessing

Compositionandnutritivevalueofnuts;postharvesttechnologiesfornuts;processingofnuts, processed pulse product- hulling and kernal peeling, drying technology, roasting,effect of processing on nutritive value of nuts.

UNITVOilseedsProcessing

Structure, composition and nutritive value of oilseeds; oil extraction methods and refining process; effect of processing on nutritive value, oil quality changes during storage: rancidity and the types; rancidity prevention methods.

TEXTBOOK

1. Chakraverty,A.(1995),"PostHarvestTechnologyofCereals,PulsesandOilseeds".Oxford and IBH Publishing Co, Calcutta.

2. Manay,N.S.Shadaksharaswamy,M.(2004),"Foods-FactsandPrinciples",Newage international publishers, New Delhi.

REFERENCEBOOK

1. N.L.Kent and A.D.Evans. (1994)"TechnologyofCereals" (4thEdition), Elsevier Science (Pergaman), Oxford, UK,

2. SamuelMatz.(1992),"TheChemistryandTechnologyofCerealsasFoodandFeed, Chapman & Hall.

3. DendyDAVandDobraszczykBJ.(2001),"CerealandCerealProducts",Aspen Publications.

WEBOGRAPHY

1. https://www.brainkart.com/article/Processing-of-cereals_33958/
2. https://cftri.res.in/Millets/
3. https://www.slideshare.net/Senthil13k/wheat-42967958
4. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5911
5. https://www.cooksinfo.com/flour-grades
6. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5913
7. https://www.slideshare.net/LinaDarokar/milling-process-rice-dal
8. https://www.slideshare.net/tusharbhar96/parboiling-of-rice
9. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5933
10. https://www.slideshare.net/tusharbhar96/parboiling-of-rice
11. https://www.slideshare.net/mobile/mahmudulmithun/postharvest-technology-of-agricultural-product
12. http://www.fao.org/3/ac301e/ac301e03.htm
13. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=805
14. https://www.cashews.org/en/cashew-processing

CEREALS,PULSESANDOILSEEDSPROCESSING PRACTICAL

Code:21FPRV0107 Credit:0+3 ContactHours/Week:3 Marks:100

Course Objectives:

• Tocreateawarenessabouttheprocessingofcereals,pulsesand oilseeds.
• Tostudythestorageandhandlingpracticesofcereals,oilseedand pulses.
• Togainknowledgeonprocessingandmillingofcereal,pulsesandoilseeds.

SpecificObjectivesof Learning

Aftercompletingthiscoursestudentswill beableto

- knowaboutthepostharvesttechnologiesforcereals, pulsesand oilseeds
- explainthe lossofnutrientsduetovariousprocessing methodsadoptedforcereals,pulses and oilseeds
- familiarwiththeprocessandproductionofvalueaddedproductsfromcereals, pulses and oilseeds.

Practical

1. Demonstrateparboilingofpaddy
2. Determinethequalityofrawand parboiled rice
3. Preparationofmilletbasedfoodproducts
4. Determinethephysiochemicalandfunctionalpropertiesofmilletflours
5. Preparationofpulsebasedfoodproducts
6. Exerciseonmethods for destructionofantinutritionalfactorsinpulses
7. Determinefunctionalpropertiesofnuts.
8. Preparationofnutsincorporated foodproducts
9. Determinethequalityofvegetableoils- saponification, acid, peroxidase value.
10. Chemicaltestsfordeterminationofrancidity-peroxide value-a measuretodetermineancidity.
11. Visittorice,millet,pulse,nuts,oilextractionandrefiningindustry

TEXTBOOK

1. Chakraverty,A.(1995),"PostHarvestTechnologyofCereals,PulsesandOilseeds".Oxford and IBH Publishing Co, Calcutta.
2. Manay,N.S.Shadaksharaswamy,M.(2004),"Foods-FactsandPrinciples",Newage international publishers, New Delhi.

REFERENCEBOOK

1. N.L.Kent and A.D.Evans. (1994)"Technology of Cereals" (4th Edition), Elsevier Science (Pergaman), Oxford, UK,

2. SamuelMatz.(1992),“TheChemistryandTechnologyofCerealsasFoodandFeed, Chapman & Hall.
3. DendyDAV&DobraszczykBJ. (2001),“CerealandCerealProducts”,AspenPublications.

WEBOGRAPHY

1. https://www.fda.gov/food/laboratory-methods-food/mpm-v-10-nuts-and-nut-products-methods
2. https://youtu.be/kVqisXuiWsc
3. https://www.millets.res.in/technologies/Technologies_of_millet_value_added_products.pdf

II SEMESTER

FOUNDATIONALENGLISHII

Code:21ENGU02F2 Credit:3 ContactHours/Week:3 Marks:100

COMPUTERFUNDAMENTALANDOFFICEAUTOMATION

Code: **Credit:4** **ContactHours/Week:4** **Marks:100**

UNITOPERATIONSINFOODPROCESSING

Code:21FPRV0209 Credit:5 ContactHours/Week:5 Marks:100

Course Objectives:

- Toprovidetheknowledgeonpreliminaryprocessingconceptsand principles
- Tounderstandthemechanism,operationofequipmentusedinfoodprocessing

SpecificLearning outcomes:

After completionofthiscourse,thestudentswill beableto

- Identifytheequipmentused forprimaryprocessing
- Selectappropriatemethodsuitableforunitoperations
- Planabasicunitoperations for foodprocessing

UNITIPreliminaryunitoperation

Cleaning, sorting and grading – aims, methods and applications and physical properties of food materials.

Preliminaryoperations-washing,sorting,peeling,cuttingorgrinding,blanching.

UNITIIConveying

Beltconveyors,chainconveyors,screwconveyors,pneumaticconveyors,vibratingandoscillating conveyors, bucket elevators – their selection, operation and maintenance in food industries.

UNITIIISizereductionandsieveanalysis

Communition, size reduction equipment: Crushers – grinders, ultrafine grinders, cutters, size enlargement.Sieving,separationbasedonsize(meshsize),Typesofscreens:stationaryscreens – grizzlies, gyrating screens, vibratory screens, and effectiveness of screens.

Sizereductionmachines-compression,impact,attritionorrubbing,cutting.

UnitIVMixing &Agitation

Measurement of mixing, rate of mixing, liquid mixing, mixing equipments-liquid mixer, powder & particle mixer, dough & paste mixer, jet mixer, static mixer, purpose of agitation, agitated vessels – impellors, propellers & turbines, kneading, Homogenization - Principle & equipment.

Unit VSeparationProcess

Filtration-principle of filtration; types of filtration. Equipment- filter press, rotary drum, shell & leaf filter, vacuum filter, centrifugal filter, filter media, filter aid, filter cake. Sedimentation meaning and principle.Equipment for sedimentation- disk centrifuges, decanters, clarifiers,hydrocyclones.

.Safedsposalmethodsofwastesinfoodseparation.

Practical

1. Determining physicalpropertiesoffoodingredients
2. Demonstratinggradingoffruitsandvegetables
3. Exerciseongrindingand sieving
4. Experimentonmixingandagitation
5. Separationofliquidsbyusingfilter paper
6. Separationofliquidbycentrifuge
7. Determinationofbulkdensity,porosityandtruedensity.
8. Visittogradingunit
9. Visittofruit,oilandmilkprocessingunit

TEXTBOOK

1. Singh,R.P.andHeldman,D.R.(2001),"Introductionto FoodEngineering",3rded., Academic Press.
2. Hui, Y.H.(2005), "HandbookofFoodScience, TechnologyandEngineering"(vol.1-4), Marcel Dekker Publishers.
3. Rao,M.A.,Rizvi,S.S.H.andDutta,A.K.(2005),"EngineeringpropertiesofFoods",3rd ed., Marcel Dekker Publishers.

REFERENCEBOOK

1. Pandey,H.,Sharma,H.K.,Chouhan,R.C.,Sarkar,B.C.andBera,M.C.(2004), "Experiments in Food Process Engineering", CBS Publishers and Distributors.
2. Sharma,S.K.,Mulvaney,S.J.andRizvi,S.S.H.(2000),"FoodProcessEngineering: Theory and Laboratory Experiments", Wiley and Sons Publishers.

WEBOGRAPHY

1. https://www.slideshare.net/mobile/knowledge1995/agitaion-and-mixing
2. https://www.slideshare.net/mobile/vickyvicky76/mixing-79330350
3. https://www.slideshare.net/mobile/urveshprajapati3990/grinding-50256980
4. https://www.slideshare.net/mobile/prem1790/grinding-162817256
5. https://www.slideshare.net/mobile/khadeejaikram56/centrifugation-49732927
6. https://www.slideserve.com/orlando-butler/cleaning-sorting-and-grading-of-tomato
7. https://www.slideshare.net/mobile/JunaidAbbas5/sorting-and-grading
8. https://www.slideshare.net/mobile/ubaidulhai/filtration-and-clarification

GRAINMILLINGTECHNOLOGY

Code:21FPRV0210 Credit:3 ContactHours/Week:3 Marks:100

Course Objectives:

- Toknowabouttheconceptsandprinciplesofgrainsprocessingandmilling.
- Tofamiliarwiththeequipmentusedforprocessingofgrain
- Toillustrateaboutthemainproducts andbyproductsofmilling

SpecificLearning Outcomes:

Aftercompletingthiscourse,thestudentswillbeableto

- understandthepostharvestpracticesadoptedforfoodgrains
- applytherightpostharvestpractice for grains
- familiarwiththeequipmentusedforgrainprocessingandmilling
- explainthefactorsaffectinggrainprocessingand milling

UNITIIntroduction toGrainProcessing

Current scenario of food grain production, post-harvest losses;- weight loss due to spoilage,qualityloss,nutritionalloss,seedviabilityloss,commercialloss,recommendedpre-processing
practicesforhandlingoffoodgrainsfortheirsafestorage,preventionandcontrolofinfestation during storage

NationalandInternationalqualitystandardsforgrains-basedongradingproperties-hectolitremass, moisture content, foreign matter, damaged grains.

UNITIIPaddyProcessing

Parboiling principle and practice, conventional and improved methods of parboiling, Theory of grain drying and grain driers, Physiochemical changes in paddy during parboiling, Parboiling advantages and limitations.

Dryingrate and dryingrate computation.

Evaluationofgraindryers-dryingtest,dryingefficiency.Effect of

drying on grain quality

UNITIIIRiceMilling

Concept of rice milling, traditional rice milling process; modern rice milling process and the machinery used for milling, advantages and disadvantages of milling machineries - Factors affectingricemilling-
ricesamplemoisturecontent,temperatureandmillingease,millsettings,duration of millimg process- products and byproducts of rice milling.

UNITIVWheatmilling

Structureand compositionofwheat, qualitycharacteristics and physicochemicalproperties of wheat, wheat milling process and milling equipment, products and by products of milling (Dalia, Atta, Semolina and flour); flour grades, quality characteristics and rheological properties of flours and their suitability for baked/other goods.

UNITVPulsesMilling

Structure and composition of pulses, quality characteristic and physiochemical properties of pulses, Varieties suitable for milling, pretreatments for difficult-to-mill (urad, arhar, moong, moth) and easy-to-mill (chana, masoor and pea) legumes, milling practices of different legumes, products and byproducts.

TEXTBOOK

1. Dendy,DAVandDobraszerk,B.J.Cerealsand cerealsProducts-Chemistryand Technology, Aspen Publication 2001.
2. Kader AA:Postharvesttechnologyofhorticulturalcrops.2ndedition,Universityof California
3. Chakraverty,A.(1995),"PostHarvest TechnologyofCereals,PulsesandOilseeds". Oxford and IBH Publishing Co, Calcutta.

REFERENCEBOOK

1. Manay,N.S.Shadaksharaswamy,M.(2004),"Foods-FactsandPrinciples",Newage international publishers, New Delhi.
2. SalunkheDKandKadamSS:Handbookofworldfoodlegumes, CRCPress,Florida.
3. Kent,N.L.TechnologyofCereals,WoodHeadPublishing,4th edition2004.

WEBOGRAPHY

1. https://www.slideshare.net/Senthil13k/wheat-42967958
2. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5911
3. https://www.cooksinfo.com/flour-grades
4. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5913
5. https://www.slideshare.net/LinaDarokar/milling-process-rice-dal
6. https://www.slideshare.net/tusharbhar96/parboiling-of-rice
7. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5933
8. https://www.slideshare.net/tusharbhar96/parboiling-of-rice
9. https://www.slideshare.net/mobile/mahmudulmithun/postharvest-technology-of-agricultural-product
10. http://www.fao.org/3/ac301e/ac301e03.htm

GRAINMILLINGTECHNOLOGYPRACTICAL

Code:21FPRV0211 Credit:3 ContactHours/Week:3 Marks:100

Course Objectives:

- Tounderstandtheprocessing techniquesofgrains.
- Toknowtheequipmentusedfor processingofgrain
- On successful completion of the subject, students will get exposure aboutProcessing of cereals, pulses and storage of cereals

SpecificLearning Outcomes:

Aftercompletingthiscourse,thestudentswillbeableto

- understandthepostharvestpracticesandlossesoffoodgrains
- applytherightpostharvestpractice for grains
- familiarwiththeequipmentusedforgrainprocessing
- explainthefactorsaffectinggrainprocessing

Practical

1. Determinethe qualityofrice grains
2. Determiningfactorsaffectingdryingefficiency
3. Comparethemillingqualityofrawandparboiledrice
4. WorkingprincipleofCommongrindingequipment-percussiongrinder, flour detacher
5. WorkingprincipleofCommonscreeningequipment-squareplansifter,rotarysieve,wheatbran finishers, bran brushing machine
6. Estimatethe glutencontentofwheat
7. Determinethequalityofwheat flour – moisture,proteincontent,Hagberg falling number,zeleny index, specific weight.
8. Exercise ondrymillingofpulses
9. Experimentonwetmillingofpulses
10. Prepareasnackbyutilizingrice,wheatandpulsesbyproduct
11. Visittoricemilling unit
12. Visittowheatmilling industry
13. Visit topulseprocessing unit

TEXTBOOK

1. Dendy,DAVandDobraszerk,B.J.CerealsandcerealsProducts-Chemistryand Technology, Aspen Publication 2001.
2. Kader AA:Postharvesttechnologyofhorticulturalcrops.2ndedition,Universityof California
3. Chakraverty,A.(1995),"PostHarvestTechnologyofCereals,PulsesandOilseeds". Oxford and IBH Publishing Co, Calcutta.

REFERENCEBOOK

1. Manay,N.S.Shadaksharaswamy,M.(2004),“Foods-FactsandPrinciples”,Newage international publishers, New Delhi.
2. SalunkheDKandKadamSS:Handbookofworldfoodlegumes, CRCPress,Florida.
3. Kent,N.L.TechnologyofCereals,WoodHead Publishing,4th edition2004.

BAKERYANDCONFECTIONARYPRODUCTS

Code:21FPRV0212 Credit:3 ContactHours/Week:3 Marks:100

Course Objectives:

- Tohighlighttheprinciplesandconceptsofbakingand confectioneries.
- Tounderstandtheimportance ofqualitycontrolprocessinbakedfoods
- Toacquiretheknowledgeabouttechnologyfor manufacturingofconfectionaryproducts

SpecificLearning Outcomes:
After completionofthiscourse,thestudentswill beableto

- Expresstheimportance ofraw materialselection inproductionofqualityproducts
- Develop novelfoodproductsbyapplyingconceptofbakingandconfectionary technology
- Evaluateandassessthequalityofbakedandconfectionaryfoods

UNITIEquipmentusedinbakeryandconfectionary industry

Scope of bakery and confectionery in food industry, Construction and working of various equipmentlikemixers,proofingchambers,doughdividers,moulderandsheeter,bakingovens, cooling chamber, sealing and packaging machines, rolling and cutting machines.

Unitoperations inbakeryindustry.

UNITIIPrincipleofbaking

Bakingmeaning,principle,commonlyused ingredientsforbakeryproducts.

Typesandqualityofflour,fat,eggs,yeast.Threetypesofdough-leaveneddough,doughmadewith boiling water, unleavened dough.

Doughdevelopmentandchemistry.

UNITIIITechnologyforproductionofbakeryproducts

Unit operations for manufacturing of bread, biscuits, role of ingredients in preparing quality bakery products, factors influencing quality of bakery products.

shelflifeandstoragepractices. .

UNITIVIntroductiontoconfectionary products

Typesofconfectionaryproducts -Characteristics ofconfectionaryproducts-Ingredientsused inconfectionaryproducts-
sugar,invertsugar,glucosesyrup,cornsyrup,cocoaproducts,dairyingredients, vegetable fats, hydrocolloids, gums and gelling agents, emulsifiers: Sugar boiled confectionery- crystalline and amorphous confectionery.

UNITVManufacturingofconfectionary products

Processingof rawmaterial,technology ofmanufacturingof toffee,chocolate,hardboiled candies, bars, chewing gums, bubble gums and Characteristics of finished products.

TEXTBOOK

1. Pyler,E.J.andGorton,L.A.(2009),"BakingScience&Technology"Vol.1Fourth Edition,Sosland Publications.
2. StanleyP.Cauvain,LindaS.Young,(2008),"BakedProducts:ScienceTechnologyand Practice". John Wiley & Sons Publishers.
3. Zhou. W, Hui Y,H; (2014), "Bakery Products Science and Technology", 2nd Edition, WileyBlackwell Publishers,

REFERENCES

1. DubeySC.2002.BasicBaking.TheSocietyofIndianBakers,NewDelhi.
2. FrancisFJ.2000.WileyEncyclopediaofFoodScience&Technology.JohnWiley&Sons.
3. ManleyD. 2000.TechnologyofBiscuits,Crackers&Cookies.2ndEd.CRC Press

BAKERYANDCONFECTIONARYPRODUCTSPRACTICAL

Code:21FPRV0213 Credit:3 ContactHours/Week:3 Marks:100

Course Objectives:

- Tohighlighttheprocessingmethodsusedinbakingandconfectioneryindustries.
- To understandtheimportance ofqualitycontrolprocessinbakedfoods
- Toacquiretheknowledgeofmanufacturingtechnologyforconfectionaryproducts

SpecificLearning Outcomes:

After completionofthiscourse,thestudentswill beableto

- Familiarwithprocessandproductionofbakedandconfectionaryfoods
- Develop novelfoodproductsbyapplyingconceptofbakingandconfectionary technology
- Evaluateandassessthequalityofbakedandconfectionaryfoods

Practical

1. Introductionto Bakeryand ConfectioneryEquipment
2. Determinationofflour quality
3. PreparationofBread and evaluationofitsquality
4. Preparationofbunandevaluationofitsquality
5. PreparationofCakeand evaluationofits quality
6. PreparationofBiscuitsand evaluationofits quality
7. PreparationofCookiesand evaluationofitsquality
8. PreparationofChocolateandevaluationofits quality
9. PreparationofBoiled candyand evaluationofitsquality
10. PreparationofToffeeand evaluationofits quality
11. PreparationofFudgeandevaluationofitsquality
12. Visitto smallscalebakeryandconfectioneryunit
13. Visittolargescale bakeryandconfectioneryunit
14. Visittosugarmanufacturingunit

TEXTBOOK

1. Pyler,E.J.andGorton,L.A.(2009),"BakingScience&Technology"Vol.1Fourth Edition,Sosland Publications.

2. StanleyP.Cauvain,LindaS.Young,(2008),"BakedProducts:ScienceTechnologyand Practice". John Wiley & Sons Publishers.

3. Zhou.W,HuiY,H;(2014),"BakeryProductsScienceandTechnology",2ndEdition,Wiley Blackwell Publishers,

REFERENCEBOOK

1. DubeySC.2002.BasicBaking.TheSocietyofIndianBakers,NewDelhi.

2. FrancisFJ.2000.WileyEncyclopediaofFoodScience&Technology.JohnWiley&Sons.

3. ManleyD. 2000.TechnologyofBiscuits,Crackers&Cookies.2ndEd.CRC Press

TECHNOLOGYFORCONVENIENCE FOODS

Code:21FPRV0214 Credit:4 ContactHours/Week:4 Marks:100

Course Objectives:

- Toknowthetypesofconveniencefoodsavailableinthemarket
- Tounderstandthesciencebehindtheproductionofconveniencefoods
- Toprovideknowledge onqualityandsafetyofconveniencefoods

SpecificLearning Outcomes:

After completionofthiscourse,thestudentswill beableto

- Identifyandselecttheconveniencefoodproductsbasedonconsumerneed
- Explainthemethodfor preparationofconveniencefoods
- Evaluateand assessthequalityofconveniencefoods

UNITIIntroductiontoconveniencefoods

Convenience Foods: Role, types: RTE, canned, frozen, dehydrate, ready prepared etc. advantages, uses, cost and contribution to diet

UNITIIFoodExtrusion

Definition, principles, Extruder types, mechanics, process and operation, uses ofextruders in thefoodindustry,extrudedproducts-readytoeat,puffedorexpandeditems,effectofextrusion on nutritional quality.

Extrudedconfectioneryitems-chewinggum,liquorice,tofee

UNITIIIMinimalprocessing offoodswith thermalmethods

Canning,retort,microwave: meaning,principle,process,advantagesandlimitations.

UNIT IV Minimal Processing of foods with non-thermal methods

Freezing,MAP,CAP:meaning,principle,process,advantagesandlimitations.

UNIT IV Quality and Safety of convenience foods

Conveniencefoods-industrytrends,processingequipment,healthyconveniencefoods,cannedfoods, prepared lunch foods, confectionery, quality assurance

Qualitychangesinminimallyprocessedfoods,microbialrisksandhealthhazards-food contamination, food poisoning, food toxicants

Practical

1. Identificationofconveniencefoodsavailableinthemarket
2. Doingamarketsurveyaboutconveniencefoods.
3. Preparationofhandmadenoodles
4. Preparationofhandmade spaghetti
5. Preparationofcannedvegetable
6. Preparationofcannedsoup
7. Preparationofspicemix
8. Evaluationofcannedfoods
9. Examinethequalitycharcteristicsofsnackfood
10. Visittocanningindustry
11. Visittopastaindustry

TEXTBOOK

1. Srivastava R. P. & Kumar Sanjeev,Sanjeev Kumar(2002). Fruit and Vegetable Preservation: Principles and Practices, International Book Distributing Company, Lucknow.

2. GirdhariLal,*G.S.Siddappa*,*G.L.Tandon*.(1998).*PreservationofFruitsandVegetables*, ICARPublication, NewDelhi.

3. Riaz,M.N.(2000).ExtrudersinFoodApplications, CRCPress, USA

REFERENCESBOOK

1. ChavanU.D.andPatilJ.V.(2013).IndustrialProcessingofFruitsandVegetables.Daya Publishing House New Delhi.

2. Lusas,E.W.&Rooney,L.W.(2001).SnackFoodProcessing.CRCPress,USA.

WEBOGRAPHY

1. https://ecoursesonline.uasri.res.in
2. https://ccsuniversity.ac.in

IIISEMESTER

FOODQUALITYEVALUATION(P)

Code:21FPRV0316 Credit:3 ContactHours/Week:3 Marks:100

Course Objectives

- Toillustratetheconceptsand principlesoffoodqualityevaluation
- Toprovidebasicknowledgeaboutsensoryevaluation
- Toknowtheinstruments/toolsavailableforobjectiveevaluation

SpecificLearning Outcomes:

After completionofthiscourse,thestudentswill beableto

- Knowwiththebasicsoffood qualityevaluation
- Suggestasuitabletechniqueforfoodqualityevaluation
- Addressthecontrollingfactorsinsensoryandobjective evaluation

UNITIIntroductiontoFoodquality

Foodqualitymeaning-propertiesand attributes

qualitytraits:sensory,chemical,microbialandtoxicologicalaspects.

UNITIISensory evaluation

Definition of sensory evaluation; sensory attributes; human sensesandsensory perception;factors influencing measurements: psychological and physiological errors.

UNITIIISensoryEvaluation methods

Sensoryevaluationprotocols-preparationroom, evaluationroom,panelists

Classificationoftestmethods;comparison:paired-comparison,duo-trioandtriangletests, ranking: numeric scoring test, hedonic scale, sensitivityand descriptive tests and procedures.

UNITIVObjectivemethodsforevaluation

Instruments/tools usedfor evaluationofsensoryattributessuchascolour, flavour,textureand taste, advantages and limitations.

Objectivetools- physical, chemicalanmicrobiologicalanalysesoffoods.

UNITV ApplicationsofSensory AnalysisintheFoodIndustry

Qualitycontrol;storagestabilitytesting;productdevelopmentandconsumeracceptance samplingandtesting – AQL and Control Charts.

Practical

1. Plananddesignsensoryevaluationlab
2. Identifythepanellistbasedonthresholdtest
3. Conductsensoryevaluationofthe givensamplesbydiscriminationtest.
4. Conductsensoryevaluationofthe givensamplesbydescriptive analysis.
5. Performsensoryevaluationofthegivensamples byqualitativetest
6. Evaluatesensorycharacteristicsofgivenfoodbyquantitative test
7. Textureanalysisofrawandprocessedfoods
8. Visittosensorylab

TEXTBOOK

1. Srilakshmi,B.(2003),"FoodScience",NewAgeInternationalPublishers,NewDelhi
2. MaynardA.Amerine,RoseMariePangborn,EdwardB.Roessler,(2013),"Principlesof Sensory Evaluation of Food", Elsevier Publications.
3. HarryT.Lawless,HildegardeHeymann,(2010),"SensoryEvaluationofFood:Principles and Practices", Springer Science & Business Media.

REFERENCEBOOK

1. Herbert Stone,JoelL.Sidel,(2012), "SensoryEvaluationPractices",AcademicPress Publishers.
2. Meilgard(1999).SensoryEvaluationTechniques,3rded.CRCPressLLC,
3. Amerine,Pangborn&Roessler(1965).PrinciplesofSensoryEvaluationoffood, Academic Press, London.

PERSONALITYDEVELOPMENT

Code: 21FPRV0317 Credit: 3 Contact Hours/week:3 Marks:100

Course Objectives:

- Tounderstandtheconceptandprincipleofpersonalitydevelopment.
- Toknowtheimportanceofinterpersonalrelationshipinteambuildingandleadership
- Tolearnaboutconflictandstressmanagementforeffectivenessofworkingin industries.

Specificlearningoutcome:

Aftercompletionofthiscourse,thestudentswillbeableto,

Develop a positive attitude in life

- Findsolutionsforeveryproblemsinlife
- Developinterpersonalrelationshipsandsocialskills

UNITIIntroduction topersonalitydevelopment:

Definition, self understanding and monitoring, determinants- personality traits- theories of personality-importance of personality development- self awareness, Motivation, Relevance and types of Motivation, Motivating the subordinates, Analysis of Motivation

Fivedimensionsofpersonality-openness,conscientiousness,extraversion,agreeableness,neuroticism (emotional instability)

UNITIIIInterpersonalRelations

IntroductiontoInterpersonalRelations,Analysisofdifferent egostates,AnalysisofTransactions, Analysis of Strokes, Analysis of Life position
Simplewaystoimproveinterpersonalskillsatworkand beyond.

UNITIIIStressandConflict Management

IntroductiontoStress, CausesofStress, Impact Stress, ManagingStress. Conflict:Introductionto Conflict, Causes of Conflictand conflict resolution.SWOT Analysis.

UNITIVTimeManagement

TimeasaResource,IdentifyImportantTimeManagementWasters,IndividualTimeManagement Styles, Techniques for better Time Management.

UNITVLeadership andteam-building

Definition- leadershipstyle-theoriesofleadership- qualitiesofaneffective leader.Teambuilding-meaning, types of teams, - importance of team building. Entrepreneue and intrapreneur.

TEXTBOOKS

1. S.NarayanaRajan.,B.Rajasekaran, G.Venkatasalapathi.,V.Vijureshnayaham., Herald. "Personalikty Development", publication division, M.S.University., Tirunalveli.
2. Stephan. P.Robbins.,(2008)., " OrganisationalBehavoiur", tenth edition., prentice hall of India., private limited, New Delhi.
3. Jit. S.Chandan., (2008), "Organisationalbehaviour", third edition. Vikas publishing house private limited.

REFERENCES:

1. Aswathappa,OrganisationalBehavior,HimalayaPublishingHouse,12thedition, 2016.
2. P.SubbaRao, Management andOrganisationalbehavior:Text, CasesandGames, Himalaya Publishing House,1st edition, 2010.
3. Mullins,OrganisationalBehavior,PearsonEducationLimited,9thedition,2010.
4. L.M.Prasad,OrganisationalBehaviour,5th edition,Sultan ChandandSons,NewDelhi, 2014

FOODPRESERVATION-PRINCIPLESAND PRACTICES

Code:21FPRV0318 Credit: 3 Contact Hours/week:3 Marks:100

Course Objectives:

- Toacquireknowledgeaboutfoodspoilageandtheir causes
- Tounderstandtheconceptandsciencebehindpreservationoffoods
- Toknowabout commonlyusedmethodoffoodpreservation

SpecificLearning Outcome:

Aftercompletionofthiscourse,thestudentswillbeableto •

Know the basics of food preservation

- Suggestsuitabletechniques forpreservationoffoods
- Applythe knowledge toimprovethe traditionalmethodofpreservation

UNITIBasicsoffoodpreservation

Foodspoilagemeaning,causes, mechanism,qualitychanges,perishableandnon-perishable foods. Food preservation: Definition, importance, principles

Traditionalmethodsoffoodpreservation-boiling,burial,confitdrying,pickling, curing,fermentation. Modern methods of food preservation- map,cap, Vacuum packing,Nonthermalplasma, hurdle technology.

UNITIIPreservation byApplication ofHeat

Preservationbyuseofhightemperature:pasteurization,sterilization,canningadvantagesand limitations. Canning-historyand steps involved, types of containers used for canning foods, spoilage encountered in canned foods.

UNITIIIPreservationbyLowTemperatureStorage

Refrigerationmeaningandprinciple,advantagesanddisadvantages,freezing:meaning,principle types of freezing, the effect on quality (chilling, cold storage, freezing and deep freezing)

UNITIVPreservationbyRemovalofMoisture

Dryinganddehydrationmeaning,meritsanddemerits,effectonfoodquality, methodsofdrying, factors affecting the process, Concentration: principles and types of concentrated foods.

Differenttypesofconcentrates-liquidconcentrates,extracts,oilconcentrates,powderconcentrates.

UNITV Preservation byuseofpreservativesand fermentation

Preservativemeaning,types-ClassIandClassIIpreservatives, mechanismofaction, meritsand demerits.Preservation by fermentation- Definition, principle, method, advantages, disadvantages.

Permissiblelimitsforpreservatives-FSSAIguidelinesfortheusageofpreservatives.

TEXTBOOKS

1. Subalakshmi,GandUdipi,S.A.(2001),"Foodprocessingandpreservation".NewAge International Publishers, New Delhi.

2. Girdharilal,G.S. and Siddappa (1986). "Preservation of Fruits and Vegetables".New Delhi:Publications and Information Division, ICAR.

3. Desoresier,W.N. and James,N. (1987)."The TechnologyofFoodPreservation".New Delhi:CBS Publishers and Distributors.

REFERENCES

1. Gould, G. W. (2012), "New Methods offood preservation", Springer Science & Business Media.

2. Manay,N.S.Shadaksharaswamy,M.(2004),"Foods-FactsandPrinciples",Newage international publishers, New Delhi.

3. Srilakshmi,B.(2003),"FoodScience",NewAgeInternationalPublishers,NewDelhi.

WEBOGRAPHY

1. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=17055
2. https://www.speakingtree.in/allslides/10-traditional-ways-to-preserve-food-before-it-gets-expired/1-canning
3. https://www.slideshare.net/Selvaprakashnavaneethan/modern-trends-in-food-preservation-81331889
4. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=5130
5. http://www.tiselab.com/pdf/Thermal-Processing-of-Food.pdf
6. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=3098
7. http://ouat.nic.in/sites/default/files/6-sterilisation_of_milk_dairy_and_food_engineering.pdf
8. http://courseware.cutm.ac.in/wp-content/uploads/2020/06/Advantages-and-Disadvantages-of-Canning.pdf
9. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111469
10. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111472
11. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111472
12. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111449
13. https://www.masterclass.com/articles/what-is-fermentation-learn-about-the-3-different-types-of-fermentation-and-6-tips-for-homemade-fermentation#what-are-the-3-different-types-of-fermentation

FOODPRESERVATION –PRINCIPLESAND PRACTICES(P)

Code:21FPRV0319 Credit: 3 Contact Hours/week:3 Marks:100

Course Objectives:

- Toacquireknowledgeaboutfoodspoilageandtheir causes
- Tounderstandtheconceptandsciencebehindpreservationoffoods
- Toknowabout commonlyusedmethodoffoodpreservation

SpecificLearning Outcomes:

Aftercompletionofthiscourse,thestudentswillbeableto •

Know the basics of food preservation

- Suggestsuitabletechniques forpreservationoffoods
- Applythe knowledge toimprovethe traditionalmethodofpreservation

Practical

1. Reviewingsings/indicationsforfoodspoilage
2. Preservationoffoodbypasteurization/sterilizationandevaluationofits quality
3. Preparationofcannedfoodsand evaluationofitsquality
4. Preservationoffood byrefrigerationstorageanditseffectonquality.
5. Preservationoffoodbyfreezinganditseffectonquality
6. Preparationofsundriedfoodproductsand evaluationofitsquality
7. Preparationofdehydratedfood productsand evaluationofitsquality
8. Preservationoffoodbyhighconcentrationofsugar/salt
9. Preservationoffoods byuseofchemicals
10. Preservationoffoods byadditionofchemicals.
11. Preservationoffoodsbyfermentation(idli,dhokla)
12. Bottlingtechniquesusedinfruitsandvegetablesforpreserv
ation
13. Reconstitutionofdriedvegetables.
14. Visittoanyfoodprocessingindustry.

TEXTBOOKS

1. Girdharilal,G.S.andSiddappa(1986).“PreservationofFruitsandVegetables”. New Delhi:Publications and Information Division, ICAR.
2. Desoresier,W.N. and James,N. (1987).“The Technology of Food Preservation”.New Delhi:CBS Publishers and Distributors.

REFERENCES:

1. Subalakshmi, G and Udipi, S.A. (2001),“Food processing and preservation”.New Age International Publishers, New Delhi.
2. Gould,G.W.(2012),“NewMethodsoffoodpreservation”,SpringerScience&Business Media.
3. Srilakshmi,B.(2003),“FoodScience”,NewAgeInternationalPublishers,NewDelhi.

DAIRYPROCESSING

Code:21FPRV0320 Credit:5 ContactHours/week:5 Marks:100

Course Objectives:

- Tofamiliarwithstepsinvolved inmilkprocessing
- Toknowthetypesofmachinery/equipment usedforprocessing. To
- provide knowledge about value addition of milk.

SpecificLearning Outcomes:

After completionofthiscourse,thestudentswill beableto

- Describe the composition and properties of milk
- Applytheknowledgetoimprovetheshelflifeofmilk
- Spelloutheprocessinglineandmachineryusedfordairyprocessing

UNITICurrent scenarioofdairyindustry

Scope,importanceandneedofdairyprocessing,variousunitswithinadairyprocessingplant, handling and operating of machineries used in a dairy processing plant

UNITIIMilkcompositionand itsproperties

Physiochemicalpropertiesofmilk-Colour,taste,pH,viscosity, boilingpoint, freezingpoint, specific heat,

Source of milk,Major and minor constituents of milk (Water, protein, lactose, fat, vitamin, mineral content),.

UNITIIIBasicoperationsin milkprocessing

Gradingofmilk-definitionandtypesofgrades, Factorsaffecting milkquality- species, breed,individual , stages of lactation,age of animal, interval between milking. collection and transportation of milk, quality and quantity tests at milk reception, storage.

UNITIVProcessing ofmarket milk

Stagesofprocessing: filtration,clarification,standardization,homogenization,pasteurization, sterilization, packaging and storage.

Equipments needed- refrigerated milk storage tank, joint filter, plate heat exchanger,homogeniser, cooling tank, CIP cleaning system.

UNITVHygieniccleaning practices

Dairy plant cleaning solutions – Detergents, Sanitizers, cleaning procedure, Cleaning efficiency, hygiene in milking area, milking operations, general considerations, animals andhousing, hygiene in dairy farm, Personal hygiene in dairy plant.

RELATEDEXPERIENCE

1. Qualityevaluationoflocallyavailablemilk
2. Detectionofadulterantsinmilk
3. Analyzethefactorsaffectingstabilityofmilk
4. Testing thequalityofpasteurizedmilk
5. Visittolocalmilkprocessingunit
6. Visit tomodernmilk industry

TEXTBOOKS

1. WalstraP,GeurtsTJ,NoomenA,JellemaA&VanBoekel MAJS.(1999).“Dairy Technology – Principles of Milk Properties and Processes”. Marcel Dekker.

2. Aneja RP, Mathur BN, ChandhanRC &Banerjee AK. (2002). “TechnologyofIndian Milk Products”. Dairy India Publ., Delhi.

3. AlanH.Varnam,(2012),“MilkandMilkProducts:Technology,chemistryandmicrobiology ”, Springer Science & Business Media Publishers.

REFERENCES

1. Robinson,R.K.,(2012),“Modern Dairy Technology:Volume2Advancesin Milk Products”, Springer Science & Business Media Publishers.

2. SmitG.(2003).“DairyProcessing–ImprovingQuality”.CRC-Woodhead Publ.

WEBOGRAPHY

1. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=3131
2. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=4164
3. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=147906
4. https://www.powershow.com/view/126090-MDVmN/MILK_PROCESSING_powerpoint_ppt_presentation
5. https://www.slideshare.net/mobile/ubaidulhai/filtration-and-clarification
6. http://www.reildairy.com/forms/RMRD.aspx#:~:text=The%20Raw%20Milk%20Reception%20Dock,located%20over%20a%20wide%20area.
7. https://en.m.wikipedia.org/wiki/Pasteurization
8. https://www.slideshare.net/mobile/ChinmaiDastikop/homogenization-of-milk
9. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=6160
10. https://www.slideshare.net/mobile/sharonabduljameela/packaging-and-storing-of-milk
11. https://www.slideshare.net/irshad2k6/factors-affecting-quality-and-quantity-of-milk-in-dairy-cattle

FOODLABORATORYANDSAFETY PRACTICES

Code:21FPRV0321 Credits: 3 Credit hours/ week: 3 Marks:100

Course Objectives:

- Tounderstandthebasicneedsandrequirementsofalaboratory
- Toprovideknowledgeaboutlaboratorywastedisposalandmanagement
- Toknowaboutthehazardsandsafetymeasurestobefollowedinalaboratory

Specificlearningoutcomes:

Aftercompletionofthiscourse,thestudentswillbeableto,

- Plan for basic operationsin thelab andmaintain cleanlinessin thelaboratory
- Handle, operate/work safely in the laboratory
- applytheknowledgetopreventaccidentalinjuries/hazardsinthelaboratory

UNITIDesignoflaboratories

The essential requirements of a laboratory, space, design of laboratories,fixed and flexibledesign laboratories, furniture and storage services, ventilation, flooring.

Safelaboratoryprocedures

UNITIIIInventory Management

Inventory Management: Planning, control and costing. Stores & storekeeping, scope & importance, purchase procedure, types of purchase, location of stores & materials, procedure for the movement of stores, different methods of pricing materials, store records. Samplerecords- sample collection records, inspection of laboratories.

Accidentandincident records

UNITIIIManagementoflab equipment

Accesstothe laboratories, maintenanceofequipment,apparatusandfurniture,servicingof equipment, preventionofequipment fromrust, dust, vibration, correct usageofinstruction manual.

UNITIVCleaningoflaboratoriesandpreparationrooms

Colourcodingofservices,emergencieswithservices,emergencyproceduresforfloodingand gas leaks, proper cleaning of laboratories.

Disposalofwastematerials-Chemicalwastes

UNITVLaboratoryhazardsandsafety measures

Hazardous chemicals and hazardous apparatus, laboratory hazards (biological, chemical, physical, electrical and psychological), emergency response related to injuries, spills and use of spill kits, laboratoryevacuation, isolation, elimination, minimisation of hazardous levelof chemicals, accident and incident records, use of goggles, protective footwear, safe work practices.

TEXTBOOKS

1. Pomeranz,Y.and Meloan,C.E.(1996).Food Analysis:Theory and Practice,CBS Publishers and Distributor, New Delhi
2. SusanneNielson(2017).FoodAnalysis, SpringerTechnologyand Engineering.

REFERENCES

1. Nationalcommitteeforclinicallaboratorystandards,(1996),Clinicallaboratorymanuals, 3 rd edition, approved guideline 3P2-3 A, Villanova, Pa.
2. Rao. S. (2010), “Testing Commissioning Operation & Maintenance of Elecricalequipments; Khanna publishers.

WEBOGRAPHY

1. https://www.preservearticles.com/education/what-are-the-basic-requirements-of-a-laboratory-management/18760
2. https://www.slideshare.net/mobile/nfs7/store-management
3. https://www.slideshare.net/mobile/RohitArora236/storekeeping-117822306
4. https://www.slideshare.net/mobile/VarshaShahane/laboratory-safety
5. https://www.pharmaguideline.com/2011/07/sop-for-laboratory-cleaning.html?m=1
6. https://www.slideshare.net/TriumvirateEnvironmental/laboratory-decontamination
7. https://www.slideshare.net/harshkhatri9083/first-aid-ppt
8. https://www.slideshare.net/VarshaShahane/emergency-management-in-laboratories
9. https://chemlab.truman.edu/laboratory-safety/emergency-procedures/

10. https://www.safety.uwa.edu.au/incidents-injuries-emergency/procedures/lab#biological
11. https://www.slideshare.net/VarshaShahane/emergency-management-in-laboratories
12. https://www.slideshare.net/prdiphamal/laboratory-hazard
13. https://slideplayer-com.cdn.ampproject.org/v/s/slideplayer.com/amp/9443277/?amp_js_v=a6&amp_gsa=1&usqp=mq331AQHKAFQArABIA%3D%3D#aoh=16219359015072&referrer=https%3A%2F%2Fwww.google.com&amp_tf=From%20%251%24s&ampshare=https%3A%2F%2Fslideplayer.com%2Fslide%2F9443277%2F
14. https://www.slideshare.net/RambabuPalaka/hazardous-waste-management-121216869
15. https://www.slideshare.net/saidwarsame/lecture-8laboratory-accidents-and

FOODLABORATORYANDSAFETY PRACTICES

Code:21FPRV0322 Credits:3 Credithours/week:3 Marks:100

Course Objectives:

- Tounderstandthebasicneedsandrequirementsofalaboratory
- Toprovideknowledgeaboutlaboratorywastedisposalandmanagement
- Toknowaboutthehazardsandsafetymeasurestobefollowedinalaboratory

Specificlearningoutcomes:

After completionofthiscourse,thestudentswill beableto,

- Planforbasicoperationsinthe laband maintaincleanlinessinthe laboratoryHandle, operate/work safely in the laboratory
- applytheknowledgetopreventaccidentalinjuries/hazardsinthelaboratory

Practical

1. Identificationofvariousapparatusand glassware
2. Preparationofsolutions indifferentconcentrations(0.1, 1&10%)
3. Preparationofsolutionindifferentmolar concentrations(0.1,1&10M)
4. Preparationsofsolutionsindifferentnormalconcentrations(0.1,1&10N).
5. Preparationofacidsandbuffers
6. Cleaning/calibrationofequipment
7. Demonstrationoffirst-aidforlabaccidents
8. Demonstrationoffireextinguishershandlingandoperation
9. Planandexerciseemergencydrill
10. Visittofoodtestinglaboratories.

TEXTBOOKS

1. Pomeranz,Y.and Meloan,C.E.(1996). Food Analysis:Theory and Practice,CBSPublishers and Distributor, New Delhi
2. SusanneNielson(2017).FoodAnalysis, SpringerTechnologyand Engineering.

REFERENCES

1. Nationalcommitteeforclinicallaboratorystandards,(1996),Clinicallaboratorymanuals, 3 rd edition, approved guideline 3P2-3 A, Villanova, Pa.
2. Rao.S.(2010),"TestingCommissioningOperation&Maintenanceof Elecrical equipments; Khanna publishers.

WEBOGRAPHY

1. https://www.slideshare.net/RIZWANABBAS3/buffer-solution-81189860
2. https://www.slideshare.net/mobile/HiwrHastear/laboratory-safety-54228792
3. https://www.slideshare.net/mobile/zoraizhaiderzoraizhaider/buffers-60163379
4. https://www.slideshare.net/mobile/PrakashPokhrel1/ph-and-buffer
5. https://www.google.com/search?q=preparation+of+acids+and+buffers+ppt&oq=preparation+of&aqs=chrome.1.69i57j35i39j35i19i39j0i19l2.8375j0j7&client=ms-android-oppo&sourceid=chrome-mobile&ie=UTF-8
6. https://www.slideshare.net/mobile/AHMEDTAXONOMIST/solutions-preparation

FOOD PACKAGING

Code:21FPRV0323 Credit:3 ContactHours/week:3Marks:100

Course Objectives:

- Tounderstandthetechnologybehindpackaging andpackagingmaterials
- Toprovideknowledgeaboutdevelopmentinfoodpackagingtechnologiesand materials.

SpecificLearning Outcome:

After completionofthiscourse,thestudentswill beableto

- knowthepropertiesofdifferentpackagingmaterials
- familiar withvariousmethodsofpackagingtoimprovetheshelflife
- Selectappropriatepackingmaterialandpackagingtechnologyfor anyfood products

UNITIIntroductionto packaging

Definition, Functions of packaging – Containment, Protection, Preservation, Promotion, Convenience, Communication. Requirements ofeffective package, Types offoodpackaging-primary, secondary and tertiary packaging.

UNITIIPackaging Materialsand theirproperties

Rigidcontainers-Glass,Woodenboxes,metalcans-Aluminiumandtinplatecontainers,Semi rigidcontainers-paperboardcartons,Flexiblepackaging-paper,plasticpouches-Lowdensity polyethylene, High density polyethylene and Polypropylene. Packaging materials for dairy products, bakery and confectionary, granular products, fruits and vegetables.

UNITIIIPackagingofdifferentfoods

Factorsdeterminingthepackagingrequirementsofvariousfoods,Packagingofperishableand processedfoods,Packagingmaterialssuitableforpackingoffreshproducesfromplantsources and animal sources, packaging materials suitable for packing of processed products.

Qualitycriteriaforpackagingmaterials-abilitytowithstandstress,punctureresistance,stability during handling and transportation.

Durableandhighquality,costeffectiveandconvenient,tamper-evident,ecofriendlyandlegalcompliance.

UNITIVPackagingTechnologies

Ordinary packaging, vacuum packaging, Aseptic packaging, Active packaging, Intelligent packaging, Modified atmospheric packaging and controlled atmospheric packaging, Shrink packaging, stretch packaging, Biodegradable packaging, Edible packaging, Tetrapacks.

Smartpackingtechnologies-signoffreshness,integrity,sensors,time, temperature.

UNITVPrinting, Labellingandsafetyconcerns infoodpack

Printing process,inks,adhesives,labelling,coding- bar codes,Food packaging closures of glass and plastic containers, Legislative and safety regulations aspects of food packaging.

HACCP,GMP,useofeffectivequalitymanagementsystems,trackandtracesystems,requirements for label content.

Practical

1. Determinegreaseresistanceofpackagingmaterials.
2. Estimatewatervapourtransmissionrateofvariouspackagingmaterials.
3. Analyzetensilestrengthofpackagingmaterial
4. Determinegaseousexchangerateofpackagingmaterials
5. Testchemicalresistanceofpackagingmaterial.
6. Shelflifestudiesofpackedfoods.
7. Ediblecoatingoffruitsandvegetables
8. Evaluatelabellingmandate incommercialpackaging
9. Visit to variousindustries,dealingwithfood packaging materialslike/paper, boardand metal cans.

TEXTBOOKS

1. Gordon L.Robertson (2012),"FoodPackaging:PrinciplesandPractice",ThirdEdition, CRC Press.
2. TakashiKadoya(2012),"FoodPackaging",Academicpress.
3. Richard Coles, Derek McDowell, Mark J. Kirwan (2003), "Food Packaging Technology", CRC Press.

REFERENCES

1. Mathlouthi,M.(1999),"FoodpackagingandPreservation".AspenPublications.
2. Ahvenainen,Raija. (2003)"NovelFoodPackagingTechniques".WoodHeadPublishing.
3. Paine,F.A.andPaine,H.Y.(1983).AHandbookofFoodPackaging.LeonardHill,Glasgow, UK

PROCESSINGOFSUGAR,SALTANDJAGGERY

Code:21FPRV0324 Credit: 2 Hours/Week: 2

Marks:50Course Objectives:

- Tounderstandtheconceptofmanufacturingsugar, saltandjaggery
- Toprovideextensiveknowledgeondifferentprocessingmethods

UNITI

Manufacturing of raw sugar, Clarification process, Crystallization process, Centrifugalprocess

UNITII

Manufacturing of refine sugar, Types of refineries, Mingling and affination process.Clarification of refine melt, Evaporation and crystallization, Specification of refine sugar

UNITIII

Raw materials for salt manufacturing, Manufacturing process- Processing rock salt andprocessing brine. Methods of salt production – Solar Evaporation method, Rock SaltMining Method, Vacuum evaporation Method.

UNITIV

Manufacturing of Jaggery and Jaggery powder. Extraction and clarification of juice,Concentration of juice to rab, Drying and packing of Jaggery. Crystallization process ofJaggery powder. Curing. Drying and packing of Jaggery powder

UNITV

Productionofjaggery–Traditionalandmodernmethods.Packagingofjaggery.

REFERENCE:

1. Chung Chi Chou (2000). Handbook of Sugar Refining: A Manual for the Design andOperation of Sugar Refining Facilities, Wile.
2. Manufactureand refiningofrawsugar-V.E.Baikow

WEBREFERENCE:

1. https://www.mortonsalt.com/salt-production-and-processing/
2. http://www.madehow.com/Volume-2/Salt.html
3. http://www.iifpt.edu.in/pmfme/jaggerymet.pdf

SEMESTERIV

INTERNETANDWEBTECHNOLOGY

Code: Credit:4 ContactHours/week:4 Marks:100

(CoursewillbeofferedbytheDepartmentofComputerScienceApplications,GRI)

GANDHI'SLIFE,THOUGHT,WORK

Code:21GSPSU001 Credit:2 ContactHours/week:2 Marks:50

MILKPRODUCTS TECHNOLOGY

Code:21FPRV0426 Credit: 3 Contact hours/week:3 Marks:100

Course Objectives:

- Tounderstandthebasicoperations inthemanufacturingofmilk products
- Toprovideknowledgeaboutvalueadditionofmilkandutilizationofitsbyproducts.

SpecificLearning Outcome:

After completionofthiscourse,thestudentswill beableto

- knowtheprocessinvolvedintheproductionofvariousmilkbased products
- familiarwithmachineriesusedforthemanufacturingofmilkproducts
- Selectappropriatetechniques fortestingofmilkproductsquality

UNITITechnologyforfluid milkproduction

Standardizedmilk,pasteurizedmilk,tonedmilk,doubletonedmilk,flavouredmilk, recombined milk etc.

UNITIITechnologyforcondensedmilkproduction

Evaporationmeaningandprinciple,milkevaporators-types,mechanism,meritsanddemerits

UNITIIITechnologyformilkpowdermanufacturing

Drying/dehydrationofmilk,typesofdriesusedfortheprocessing,meritsandlimitations.

UNITIVTechnology forFermented milkproducts Manufacturing

Methodformanufactureofmilkpowder,butter,cheese,icecream,khoa,channa,paneer, shrikhand, ghee, curd, yoghurt.

Manufacture of sour cream, yoghurt, kephir, talai, ymer, cultured butter milk,filmjok(Scandinavian sour milk, cultured cream, koumiss)

UNITVMilksubstitutesandspecialitymilkbenerages

Lactone,spraydriedinfantfoods,whey, gheeresidueandimitation milk.

Lactosereduced,lactosefreemilk,acidophilusmilk,carbohydratereducedmilk,vitaminfortified milk.

TEXTBOOKS

1. Aneja RP, Mathur BN, ChandhanRC &Banerjee AK. (2002). "TechnologyofIndian Milk Products". Dairy India Publ., Delhi.

2. AlanH.Varnam,(2012),"MilkandMilkProducts:Technology,chemistryandmicrobiology", Springer Science & Business Media Publishers.

REFERENCES

1. WalstraP,GeurtsTJ,NoomenA,JellemaA&VanBoekelMAJS.(1999).“Dairy Technology – Principles of Milk Properties and Processes”. Marcel Dekker.

2. Robinson,R.K.,(2012),“Modern Dairy Technology: Volume 2Advancesin Milk Products”, Springer Science & Business Media Publishers.

3. SmitG.(2003).“DairyProcessing–ImprovingQuality”.CRC-Woodhead Publ.

WEBOGRAPHY

1. https://www.slideshare.net/bknanjwade/drying-53262955
2. https://www.slideshare.net/mobile/phuonghong290/milk-powder
3. https://www.vegrecipesofindia.com/chaas-recipe-buttermilk-recipe/
4. https://www.slideshare.net/mobile/akankshashrivastava3/spray-drying-54159904
5. https://www.slideshare.net/mobile/pallaviBS4/spray-drying-pdf-in-food-industry
6. https://www.slideshare.net/mobile/ChethanN23/ghee-residue
7. https://www.slideshare.net/mobile/ankitabroad/fermented-milk-products
8. https://www.slideshare.net/mobile/Ajay_1969/malai-kulfi
9. https://www.slideshare.net/mobile/harishsurapureddy/khoa-60507939
10. http://calon.catpictures.co/khoa-preparation-flow-chart/
11. https://www.slideshare.net/mobile/prathameshkudalkar7/dehydration-of-milk
12. https://www.whiskaffair.com/kesar-elaichi-srikhand/
13. https://www.slideshare.net/mobile/khalidnawaz754/evaporators-29906336

MILKPRODUCTSTECHNOLOGYPRACTICAL

Code:21FPRV0427 Credit: 3 Contact Hours/week:3 Marks:100

Course Objectives:

- Tounderstandthebasicoperations inthemanufacturingofmilk products
- Toprovideknowledgeaboutvalueadditionofmilkandutilizationofitsby products.

SpecificLearning Outcome:

After completionofthiscourse,thestudentswill beableto

- know the process involved in the production of various milk based
- productsfamiliarwithmachineriesusedforthemanufacturingofmilk
- productsSelect appropriate techniques for testing of milk products quality

Practical

1. DeterminetheCaseincontent ofthemilk.
2. Check the sterilityofmilkbyTurbiditytest.
3. PreparationofFlavouredmilk
4. PreparationofCurdsandShrikhand
5. PreparationofKhoa
6. PreparationofPaneer
7. PreparationofIce-creamandKulfi
8. Preparationofdahi, cream,buttermilkandpaneer.
9. Determinationofbutyro refractometerreadinginghee.
10. Preparationofsampleofwheypowder.
11. Preparationandqualityvaluationofspraydriedmilk
12. Visittoindustrialunits-curd,buttermilk,paneerandice-cream

TEXTBOOKS

1. Aneja RP, Mathur BN, ChandhanRC &Banerjee AK. (2002). "TechnologyofIndian Milk Products". Dairy India Publ., Delhi.

2. AlanH.Varnam,(2012),"MilkandMilkProducts:Technology,chemistryandmicrobiology", Springer Science & Business Media Publishers.

REFERENCES

1. WalstraP,GeurtsTJ,NoomenA,JellemaA&VanBoekelMAJS.(1999).“Dairy Technology – Principles of Milk Properties and Processes”. Marcel Dekker.

2. Robinson,R.K.,(2012),“Modern Dairy Technology: Volume 2Advancesin Milk Products”, Springer Science & Business Media Publishers.

3. SmitG.(2003).“DairyProcessing–ImprovingQuality”.CRC-Woodhead Publ.

WEBOGRAPHY

1. https://www.slideshare.net/Senthil13k/wheat-42967958
2. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5911
3. https://www.cooksinfo.com/flour-grades
4. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5913
5. https://www.slideshare.net/LinaDarokar/milling-process-rice-dal
6. https://www.slideshare.net/tusharbhar96/parboiling-of-rice
7. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5933
8. https://www.slideshare.net/tusharbhar96/parboiling-of-rice
9. https://www.slideshare.net/mobile/mahmudulmithun/postharvest-technology-of-agricultural-product
10. http://www.fao.org/3/ac301e/ac301e03.htm

FOODANALYSISANDQUALITYTESTING

Code:21FPRV0428 Credit: 4 Contact Hours/week:4 Marks:100

Course Objectives:

- Tounderstandtheconceptofsamplingandpreparationfortestingoffoodquality
- Toprovideknowledgeaboutmethodsusedfortestingof food

SpecificLearning Outcomes:

Aftercompletionofthiscourse,thestudentswillbeableto

- Select suitablemethodsfor analysisoffoodquality
- Explain the principle,mechanism and applications of instrumentsfor food analysis
- Apply the knowledge to identify contaminant/adulterant in the foods

UNITIIntroduction tofood quality

Definition ofquality andconcepts, quality attributes (safety, sensory, shelf life, convenience, extrinsic attributes), factors affecting food quality.- climate change, harvesting, processing,drying, packaging, content of primary and secondary metabolites in food.

UNITIIIMethodsoffoodanalysis

Common analytical methods of food analysis- mass spectrometry coupled with Gaschromatography,capillaryelectrophoresis,infraredspectroscopy,nuclearmagneticresonance spectroscopy.

Methods: Titration, colorimeter, calorimetry, chromatography principle, types, instrumentation, advantages and limitations.

UNITIIINutrientanalysis

Sampling –objectives, Guidelines, Methods.AnalysisofFood: Moisture,Carbohydrate, Fat, Protein, Crude Fibre, Vitamins and Minerals.

UNITIVNon-nutrientanalysis

Phytochemicals: alkaloids, tannin, glycosides etc. antinutritional factors: Trypsin inhibitor, favism, lathyrism, etc., additives: colours, flavours, sweeteners etc.

UNITVContaminant/toxicantanalysis

Heavy metals, veterinarydrug residues, environmentalpollutants. Permissibleleveloffoodadditives,adulterants,pesticideresidues,

TEXTBOOKS

1. Pomeranz,Y.and Meloan,C.E.(1996). Food Analysis:Theory and Practice,CBS Publishers and Distributor, New Delhi

2. Ranganna,S.(1986).HandbookofAnalysisandQualityControlforFruitand Vegetable Products, 2nd Edition, Tata Mc Graw hill Publishing Co Ltd., New Delhi

REFERENCES

1. Kher,C.P.(2000). Qualitycontrolforthefoodindustry. ITCPublishers,Geneva.

2. Early,R.(1995).GuidetoQualityManagement SystemsfortheFoodIndustry,Blackie, Academic and Professional, London

3. Gould,W.A.andGould,R.W.1988.TotalQualityAssurance fortheFoodIndustries, CTI Publications Inc, Baltimore

Webography

1. https://ncert.nic.in/textbook/pdf/lehe106.pdf
2. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=1019
3. https://digital.csic.es/bitstream/10261/109484/4/ADVANCED%20ANALYSIS%20OF%20CARBOHYDRATES.pdf
4. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=90220
5. http://www.fao.org/3/AM808E/AM808E.pdf
6. https://www.mdpi.com/2223-7747/6/4/42/pdf

FOODANALYSISANDQUALITYTESTINGPRACTICAL

Code:21FPRV0429 Credit: 4 ContactHours/week:4 Marks:100

Course Objectives:

- To understand themethodsoffood qualityanalysis
- Toprovidehandsontraininginfoodtestingandqualityanalysis

SpecificLearning Outcomes:

Aftercompletionofthiscourse,thestudentswillbeableto Familiar

- with the food testing methods
- Knowabouttheequipmentusedinfoodanalysis

Practical

1. EstimationofpHandbuffer
2. Preparationofstandardsolutions forthechemicalssolutionsandbuffers foranalysis
3. Determinationofmoisture contentoffood
4. Determinationoffatcontentoffood
5. Determinationofbetacaroteneinfood.
6. Determinationofproteincontentoffood
7. Determinationofcrudefibercontentoffood
8. Determinationofashcontentof food
9. Estimationofcalciumandironcontentoffood
10. EstimationofpH andTotalAcidity
11. Determinationofantinutritionalfactorsinfoods
12. Determinethepermissibleleveloffoodadditives
13. Detectionofadulterantsinfood
14. Testfordetectionofpesticideresiduesinfood
15. Visittofoodtestinglab

TEXTBOOKS

1. Pomeranz,Y.and Meloan,C.E.(1996). Food Analysis:Theory and Practice,CBS Publishers and Distributor, New Delhi
2. Ranganna,S.(1986).HandbookofAnalysisandQualityControlforFruitand Vegetable Products, 2nd Edition, Tata Mc Graw hill Publishing Co Ltd., New Delhi

REFERENCES

1. Kher,C.P.(2000). Qualitycontrolforthefoodindustry. ITCPublishers,Geneva.
2. Early,R.(1995).GuidetoQualityManagementSystemsfortheFoodIndustry,Blackie, Academic and Professional, London
3. Gould,W.A.andGould,R.W.1988.TotalQualityAssurance fortheFoodIndustries, CTI Publications Inc, Baltimore

WEBOGRAPHY

1. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=90220
2. https://rfssh.wordpress.com/2014/09/25/estimation-of-crude-fibre/
3. https://discoverfoodtech.com/soxhlet-extraction-method/
4. https://discoverfoodtech.com/protein-estimation-by-kjeldahl-method/
5. https://cwsimons.com/determination-of-ash-content/#:~:text=Ash%20content%20represents%20the%20inorganic,at%20500%20%E2%80%93%20600%20oC.&text=Ash%20content%20determination%20is%20widely,quality%20measure%20for%20flour%20extraction.
6. http://egyankosh.ac.in/bitstream/123456789/33675/1/Practical%208.pdf

FOODMICROBIOLOGY(T)

Code:21FPRV0430 Credit:2 ContactHours/week:2 Marks:50

Course Objectives:

- Tounderstandtheroleofmicroorganisminfood
- Toknowthefactorsinfluencingmicroorganismgrowth
- Torecognizethespoilage microorganismsin food

SpecificLearning Outcomes:

After completionofthiscourse,thestudentswill beableto

- Describethecharacteristicsofbeneficialandspoilagemicroorganisms
- Signifythecontributionsofmicroorganismstofoodandhealth
- Identifythemicroorganismsresponsibleforspoilageoffoods.

UNITIIntroduction tofood microbiology

Discovery,currentstatus,roleoffoodmicrobiology,sourcesofmicroorganismsinfood,changes caused by microorganisms - food fermentation, putrefaction, lipolysis.

UNITIICharacteristicsof microorganisms

Classification of microorganisms,nomenclature, morphology –yeastandmoulds,bacterialcells, viruses. Growth and survival of microorganisms in foods, food hygiene and sanitation:

Contaminationduringhandlingandprocessinganditscontrol;indicatororganisms.

UNITIIIBeneficialusesof microorganisms

Microorganismsusedinfoodfermentation, mechanismsofnutrienttransport,applicationingenetics, intestinal bacteria and probiotics, food bio preservatives of bacterial origin, foodingredients and enzymes of microbial origin.

UNITIVMicrobialspoilageoffood

Food spoilage – Introduction, spoilage in cereals, vegetables and fruits, meat, eggs, poultry,fish, milkand milkproducts,canned foods,nutsandoilseeds, fatsandoilseeds.Definition -food infection and food intoxication.

UNITV Microbialexaminationand investigation

GeneralMicrobiologicalMethodsofenumerationandisolationofbacteriaandfungi:conventional(serialdilution/pour platetechnique) and modern methods (RIA, ELISA, PCR).

TEXTBOOKS

1. Frazier.W.C.,andWesthoffD.C.(1992),"FoodMicrobiology",TataMcGrawHillPublishing Co., Ltd., New Delhi.
2. Adams,MartinR,MauriceOMoss,PeterMcClure(2015),"FoodMicrobiology",Royal Society of Chemistry, Cambridge.
3. Jay,JamesM.(2012),"ModernFoodMicrobiology",SpringerScience&BusinessMedia., Maryland.

REFERENCES

1. Ray,Bibek;ArunBhunia,(2013), "FundamentalFoodMicrobiology", CRCPress.
2. BibekRay."Fundamentalfoodmicrobiology".CRCPress.3rdEdition.2005.

FOODMICROBIOLOGY(P)

Code:21FPRV0431 Credit: 3 Contact Hours/week:3 Marks:100

Practical

1. Demonstrationofmicroscopepartsandits utility
2. Useofmicroscopetoidentifyanddifferentiatebacteria,yeastandmold
3. Preparationofglasswareand media formicrobialtesting
4. Useandcareoflaminarairflowchamber
5. Microbiologicallaboratorystandardsandsafetyprotocols.
6. Culturemediaprepareationofbacteriaandfungi.
7. Stainingofmicroorganismsandtheir examination.
8. DeterminationofTotalPlateCount (TPC),viablecountsin foods
9. Isolationofbacteriainfood
10. Enumerationofyeastand mouldinfood
11. Microbiologicalexaminationofpotablewater: Totalandcoliformcount.
12. Preparationofyoghurt
13. Visit tomicrobiologylaboratory
14. Visittoindustryrelatedtofoodmicrobiologythatisolatemicrobesforvariouspurposes.

TEXTBOOKS

1. Frazier.W.C.,andWesthoffD.C.(1992),"FoodMicrobiology",TataMcGrawHill Publishing Co., Ltd., New Delhi.
2. Adams,MartinR,MauriceOMoss,PeterMcClure(2015),"FoodMicrobiology", Royal Society of Chemistry, Cambridge.
3. Jay,JamesM.(2012),"ModernFoodMicrobiology",SpringerScience&Business Media., Maryland.

REFERENCES

1. Ray,Bibek;ArunBhunia,(2013), "FundamentalFoodMicrobiology", CRCPress.
2. BibekRay."Fundamentalfoodmicrobiology".CRCPress.3rdEdition.2005.

FOODQUALITYASSURANCE

Code:21FPRV0432 Credit:3 ContactHours/week:3 Marks:100

Course Objectives:

- Tounderstand foodlawsandregulationsgoverningthequalityoffoods
- To know about Intellectual property rights
- Toidentifythefactorsaffectingfoodqualityassurance

SpecificLearning Outcomes:

Aftercompletionofthiscourse,thestudentswillbeable to

- Describethelawsandstandardsrelatedtofoodqualityassurance
- Signifythe importance of intellectualpropertyrightsto avoid food
- fraudsApplytheknowledgetomaintainqualityin foodindustries.

UNITIConceptsofqualitymanagement

Objectives,importanceandfunctionsofqualitycontrol,QualitymanagementsystemsinIndia, Sampling procedures and plans, Food Safetyand Standards Act, 2006, Domestic regulations, Global Food safety Initiative.

Factorsaffectingfoodquality-qualityattributes.- physical,chemical,nutritional,microbialandsensory- measurement and evaluation.

UNITIIFoodLawsandStandards

Organizations dealing with inspection, traceability and authentication, certification and qualityassurance-PFA,FPO,MMPO,MPO,AGMARK,BIS;Labelingissues,International food standards.

UNITIIIFoodqualitycontrol

Concepts of quality control, Need and importance of quality control programmes such as qualityplan,documentationofrecords,productstandardsProductandpurchasespecifications and process control; Duties and responsibilities of food quality controller.

UNITIVFoodQualityAssurance

Concept of quality assurance, need and importance, Total Quality Management, GMP/GHP, GLP, GAP, Sanitary and hygienic practices, Quality manuals, documentation and audits.

Qualityimprovementplans,qualitycontrolcycle.

Dutiesandresponsibilitiesoffoodqualitycontroller.

UNITV FoodQuality System

Indian & International quality systems and standards like ISO and Food Codex, Export importpolicy,HazardanalysisCriticalControlPoint:Definition,principles,Guidelinesfor the application of HACCP system.

TEXTBOOKS

1. Kher,C.P. Qualitycontrolfor thefoodindustry.ITCPublishers, Geneva. 2000.
2. Philip,A.C.Reconceptualizingquality.NewAgeInternationalPublishers,Bangalore.

REFERENCES

1. Yong-Jin Cho, Sukwon Kang.(2011), “Emerging Technologies for Food Quality and Food Safety Evaluation” ,CRC Press.
2. AlliInteaz,(2003),“FoodQualityAssurance:Princ0iplesandPractices”,CRCPress.
3. VasconcellosJ.Andres,(2003),“QualityAssurancefortheFoodIndustry:APractical Approach”,CRC Press.

WEBOGRAPHY

1. https://www.yourarticlelibrary.com/production-management/quality-control-meaning-importance-definition-and-objectives/26174
2. http://www.fao.org/3/i1379e/i1379e05.pdf
3. https://www.indiacode.nic.in/bitstream/123456789/7800/1/200634_food_safety_and_standards_act%2C_2006.pdf
4. https://ourworldisnotforsale.net/2017/Domestic_Regulation.pdf
5. https://www.grains.k-state.edu/spirel/docs/conferences/mb-alternatives/presentation/m%20olewnik.pdf
6. https://en.wikipedia.org/wiki/Global_Food_Safety_Initiative
7. https://www.invensislearning.com/blog/quality-control-inspector-roles-responsibilities/
8. https://www.fda.gov/food/hazard-analysis-critical-control-point-haccp/haccp-principles-application-guidelines
9. http://www.eximguru.com/exim/guides/export-finance/ch_13_exim_policy.aspx#:~:text=Export%20Import%20Policy%20or%20better,and%20Regulation%20Act)%2C%201992.
10. http://www.fao.org/3/t0396e/t0396e.pdf

SEMESTERV

FOODBUSINESSMANAGEMENT

Code:21FPRV0534 Credit: 3 Contact Hours/week:3 Marks:100

Course Objectives:

- Tounderstandconceptandprincipleofmanagement
- Toknowthescopesandimportanceinfoodbusinessmanagement
- To provide knowledge about trade and marketing.

SpecificLearning Outcome:

Afterlearningthiscourse,thestudentswill beableto,

- Explainthescopeandimportanceofmanagementinfoodbusiness
- Describethelineofmanagementandtherulesforeffectivemanagement
- Outline the agencies related to food trade and marketing

UNITIIntroductiontoManagement

Meaning, nature and characteristics of Management - Scope and functional areas of management - Management as a science art or profession - Management &Administration – Principles of management - Social responsibility of management.

UNITIIPrinciplesofmanagementI

Planning: Nature, importance and purpose, Planning process, objectives - Types of plans, Organisation: Principles of organisation, Types of organization, Organisation Chart-Organisation manual, Natureand importanceofstaffing - Processofselection&recruitment-Planning, analysis, searching, screening, engagement, selection and onboarding.

UNITIIIPrinciplesofmanagement II

Directing: Meaning and nature of directing, Motivation: meaning & importance, Theories of Motivation – Maslow's theory of hierarchial needs, Hertzberg's two factor theory,Mcclelland'stheoryofneeds,vrooms'stheoryofexpectancy,Mcgreogor'stheoryofXandY.

Leadership:MeaningStyles,Coordination:Meaningand importance.

Meaning and steps in controlling - Essentials of a sound control system - Methods of establishing control-Control by Exception.

UNITIVFoodbusinessopportunitiesandchallenges

Patternsandtypesoffoodconsumptionacrosstheglobe,ethnicfoodhabitsofdifferentregions, consumer behaviour, export trends and prospects of food products in India, food industry management, marketing management- product, price, place and promotion.Five steps inmarketing management- markting analysis, marketing goals, marketing strategy, marketingmix, marketing maonitoring.Sectorsinfoodindustry– Farmservicesector,producer'ssector,processor's sector, marketor's sector,Scale of operations in India

UNITVFoodTradeandmarketing

Foreignexchange, mechanicsofforeignexchange,roleofWTO,GATT, internationaltradein agriculture, world trade agreements, APEDA, Tea board, spice board, MoFPI,etc., management of export and import organisation, registration , documentation, export import logistics.

Roleoflogisticsin supplychainmanagement-to pla, implement,controlofflowofgoodsandservices inside and outside the country.

TEXTBOOKS

1. Chhhabre TN &SuriaRK(2001), " Management process and Perspectives", KitabMahal.
2. PrasadL.M.(2011)."PrinciplesandPracticeofMangement",PublishedbySultan Chand & Sons.
3. Kotler.P,(2000),"MarketingManagement",Prenticehall.

REFERENCES

1. Harmon, P. (2007), Business Process Change : A Guide for Business Managers andBPM and Six Sigma Professionals, Elsevier/Morgan Kaufmann Publishers.
2. R.Anupindiet al.(2006),ManagingBusinessProcessFlows:PrinciplesofOperations Management, Pearson Education Inc.

ENTREPRENEURSHIPDEVELOPMENT

Code:21FPRV0535 Credit: 3 Contact Hours/week:3 Marks:100

Course Objectives:

- Tounderstandtheroleandimportanceofentrepreneursinnationbuilding
- To imbibe the qualities of entrepreneur
- Toknowabouttheagenciessupportingforentrepreneurshipdevelopmentprogrammes

SpecificLearning Outcomes

After completionofthiscourse,thestudentswill beableto

- Describethefeaturesofgovernment programmesforentrepreneurshipdevelopment
- Know the characteristics/traits of an entrepreneur
- Inculcateentrepreneurialskillstobecomeentrepreneur

UNITI Introduction

Concepts of entrepreneur, entrepreneurship and entrepreneur - Characteristics and competencies of a successful entrepreneur - General functions of an entrepreneur - Type of entrepreneurs - Role of entrepreneur in economic development - Distinction between an entrepreneur and a manager - Entrepreneur and Intrepreneur.

UNITIIEntrepreneurshipdevelopment

Emergence of entrepreneurship - Economic and non economic factors for stimulating entrepreneurshipdevelopment -Obstaclestoentrepreneurshipdevelopment inIndia -Growth of entrepreneurship in India.

GrowthrateofentrepreneurshipinIndia-prepanademic and postpandemic.

UNITIIIEntrepreneurialDevelopmentProgrammes

Concept and meaning of entrepreneurship development - Need for entrepreneurship development programmes (EDPs) - Objectives of EDPs - Organizations for EDPs in India; NIESBUD, SISItheir roles and activities.

Phasesofentrepreneurialdevelopmentprogramme.

UNITIVGrowth of Entrepreneurship

Schemes for assistance – State and Central levelcurrent schemes and programmes for individual andgroup support.SIDCO, DIC, SIDBI, TIIC NSIC,MSME- Objectives, Programmes, Financial Assistance,

UNITVWomenEntrepreneurship

Concept of women entrepreneurship - Reasons for growth of woman entrepreneurship - Problems faced by women entrepreneurs- gender gap, management challenges, work lifebalance challenges, safety concerns, limited risk taking and remedial measures.

RELATEDEXPERIENCE

1. Casestudyofsuccessiveentrepreneurs
2. Visitto SIDCO
3. VisittoDIC
4. VisittoMSME centers

TEXTBOOKS

1. Michael HMorris,Corporate EntrepreneurshipandInnovationin Corporations,7th Edition, CENGAGE Learning, Delhi, 2010
2. JerryKatz,EntrepreneurshipSmallBusiness,5thedition,TataMcGraw-HillPublishing Company Ltd., New Delhi, 2007.

REFERENCES

1. Khanka S.S., Entrepreneurial Development, 1st edition, S.Chand and Company Limited, New Delhi, 2013.
2. Prasama Chandra, Projects: Planning, Analysis, Selection, Implementation and Reviews, 2nd edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 1996.
3. Robert D. Hisrich, Entrepreneurship, 10th edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2017.

WEBOGRAPHY

1. http://www.simplynotes.in/e-notes/mbabba/entrepreneurship-development/
2. https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_Entrepreneurial_Development_NOTES.pdf
3. https://www.dynamictutorialsandservices.org/2018/10/entrepreneurship-development-notes.html
4. http://www.gplohaghat.org.in/download/file/oG6FoOTS2G.pdf
5. https://www.pasc.edu.in/wp-content/uploads/2021/04/ENTREPRENEURSHIP-DEVELOPMENT-III-BBA.pdf

COMPUTERAPPLICATIONSINFOODINDUSTRY

Code:21FPRV0536 Credit: 3 Hours/ week: 3

Marks:100Course Objectives:

- Toimpartknowledgerelatedtotheapplicationsofcomputationinfoodindustries
- Toexposethe studentswithfundamentalknowledge onthe computersoftware

Learning Outcome:

Students will gain knowledge regarding the computer applications and how to use theapplications in food industry.

UNITI

Importance of computerization in food industry, operating environments and informationsystems for various types of food industries, principles of communication

UNITII

Supervisory Control and Data Acquision (SCADA): Introduction to SCADA, SCADAsystemshardwareand firmware, SCADAsystemssoftwareandprotocols, landlines, localarea network systems, modems, central site computer facilities

UNITIII

Web hosting and Webpage Design: Domain registration, web hosting, webpage designusing web publishing software; Introduction to File Transfer Protocol(FTP); Online foodprocess control from centralized server system in processing plant

UNITIV

Introduction to CFD Applications in Food Industry: Introduction to Computational FluidDynamics (CFD), governing equations of fluid dynamics. Models of flow, substantialderivative, divergence of velocity, continuity, momentumand energy equations. Physicalboundary conditions, discretization. Applications ofCFD in Food and beverage industry.Introduction to CFD softwares, GAMBIT and Fluent softwares

UNITV

UseofSoftwarepackagesfor:Summarizationandtabulationofdata;Descriptivestatistics;Graphical representation of data, Exploratory data analysis.

REFERENCE:

1. Chary SN(2004),ProductionandOperationsManagement,TataMcGrawHillIIIEdition.
2. AnilKumar,SandSuresh,N(2009),OperationsManagement,NewAgeInternational (P)Ltd.,Publishers,NewDelhi
3. Slack,N,Chambers,SandJhonston,R(2007)OperationsManagement,PearsonEducation Ltd., Essex, UK
4. JosephG.Monks(1997),OperationsManagementTheoryandProblems,Mc.GrawHillIII Edition

WEBOGRAPHY:

1. https://electricalfundablog.com/scada-system-components-architecture/
2. https://www.automationit.com/blog/73-5-ways-scada-can-improve-food-and-beverage-manufacturing
3. https://www.slideshare.net/PraveenKumar3664/introduction-to-scada-123955975
4. https://www.slideshare.net/malditangpinay/basic-lecture-on-domains-and-webhosting
5. https://www.slideshare.net/respected/web-hosting-32614653
6. https://www.slideshare.net/ZeeshanInamdar2/computational-fluid-dynamics-92032469

POSTHARVESTTECHNOLOGYOFFRUITSANDVEGETABLES(P)

Code: 21FPRV0537 Credit: 3 Contact Hours/week:3 Marks:100

Course Objectives:

- Tounderstandthechangesinoffruitsandvegetablesduringmaturity,ripeningand storage
- Toknowaboutthepostharvestmanagementsystemsforfruitsandvegetables
- To familiar with quality indices for fruits and vegetable selection and harvest

Specificlearningoutcome:

After thecompletionofthiscourse,thestudentswillbeableto,

- Describethequalitychanges infruitsandvegetablesafter harvest
- Selectappropriatemethodstocontrolthelossofqualityinfruitsandvegetablesduring handling, transport and storage
- Applytheknowledgeto extend theshelflifeoffruitsand vegetables

UNITIOverviewofproductionandprocessing scenario

Productionoffruitsand vegetablesinIndiaandworld.Post harvest lossesoffruitsand vegetables,controloflossesinharvestingand handlingoperations.Scopeoffruit and vegetable processing industry Present status, constraints and prospects.

ScopeoffruitandvegetablepreservationindustryinIndia

UNITIIPre- harvest changesinfruitsandvegetables

Maturityindicesforfruitsandvegetables,compositionandnutritivevaluechangesof importantfruitsandvegetables.Physiologyofrespiration.Factorsaffectingrateofrespiration.

Primaryprocessing- pretreatmentsdoneforfruitsandvegetables.

UNITIIIFruitandvegetable ripening

Biosynthesisofethylene- itsregulationandactiononharvestedfruits.Roleofethylene infruit ripening. Various controlling agents usedto regulate ethylene action. Ripening process;Fruit maturation and ripening.Physiological changes occurring during ripening of fleshy fruits.Climacteric and non-climacteric fruits.

UNITIVPostharvest changesinfruits andvegetables

Methodofharvesting, toolsused forharvesting, perishableandnon-perishablecrops, Lossof water fromharvested horticulturalcrops. Changes in colour,textureand flavour after harvest and the factors influencing it.

Byproductsutilisation

UNITVStorageoffruitsand vegetables

Storage systems for fruits for fruits and vegetables; Types of storage; zero energy cool chamber, low temperature storage, hypobaric storage, modified atmospheric storage, controlled atmospheric storage.

Storageenvironement-darkaerated, cool, humidatmosphere.

Practical

1. Determinematuringindicesofselectedfruitsandvegetables
2. Demonstrateharvestingmethodandthetoolsusedforharvesting
3. Effectofprecooling onshelflifeoffruitsand vegetables
4. Influenceofpre treatmentsonselectedfruitsandvegetablesquality
5. DeterminationofTSSandacidityoffruits
6. Testthequalityoffruitssubjected to chemicalripening process
7. Prepackagingoffruitsandevaluationofits quality
8. Prepackagingofvegetablesandevaluationofits quality
9. Valueadditionand processing offruits
10. Valueadditionand processing ofvegetables
11. Visit tocommercialpackaging unit
12. Visittocommercialstorageunit

TEXTBOOKS

1. ThompsonAK.1995.PostHarvest TechnologyofFruitsand Vegetables.BlackwellSci.
2. Kadar AA.1992. Post-harvest TechnologyofHorticulturalCrops. 2nd Ed. Universiity of California.
3. Lloyd,A.&Penizer,R(1998).Handling,transportationandstorageoffruitsand vegetables, AVI Publications
4. VermaLR.&JoshiVK.2000.PostHarvestTechnologyofFruitsandVegetables.Indus Publ.

REFERENCES

1. PantasticoB.1975.PostHarvestPhysiology,HandlingandUtilizationofTropicaland Subtropical Fruits and Vegetables. AVI Publ.
2. Salunkhe DK, Bolia HR & Reddy NR. 1991. Storage, Processing and Nutritional Quality of Fruits and Vegetables. Vol. I. Fruits and Vegetables. CRC.
3. Wills, R.B. (2002). Post harvest: An Introduction to the physiology and handling of fruits and vegetables, CBS Publishers & Distributors, New Delhi.
4. Verma, L.R., & Joshi, V.K. (2004). Post harvest technology of fruits and vegetables handling, processing, fermentationandwastemanagement, IndusPublishingCo.New Delhi.

WEBOGRAPHY

1. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5816
2. https://www.slideshare.net/KarlLouisseObispo/lecture-1-importance-of-postharvest-technology
3. http://www.fao.org/3/au186e/au186e.pdf
4. https://www.wnc.edu/files/departments/ce/sci/postharvesthandling.pdf
5. https://www.destechpub.com/wp-content/uploads/2015/01/Post-harvest-Technologies-of-Fruits-Vegetables-preview.pdf
6. http://www.fao.org/3/y4358e/y4358e05.htm

FRUITSANDVEGETABLES PROCESSING(T)

Code:21FPRV0538 Credit: 3 Contact Hours/ Week:3 Marks:100

Course Objectives:

- Tohighlightthe importanceoffruitandvegetableprocessing
- To understand the changes in quality of fruits and vegetables during processing and storage
- To provide knowledge on technologyofpreservation and value addition of fruits and vegetables

SpecificLearning Outcomes:

After completionofthiscourse,thestudentswill beableto

- knowthepost harvestmanagement systemsforfruitsandvegetables
- familiar withvariousmethodsofpreservation
- toimprovetheshelflifeoffruitsandvegetables
- processandproducevalueaddedproductsfromfruitsand vegetables

UNITIScenariooffruitandvegetableprocessing

An over view of production and processing scenario of fruits and vegetables in India and World. Post harvest management offruits and vegetables-controlof losses in harvesting, and handlingoperations.Scopeoffruitandvegetablepreservationindustry inIndia.Presentstatus, constraints and prospects.

Post harvest processing and storage- maturity stanards, methods of maturity determinations,harvesting of important fruits and vegetables, chemical changes during fruit ripening, itsmethods and regulations.

UNITIIPrimaryprocessingoffruitsand vegetables

Selection, cleaning, washing, peeling, cutting/slicing, grading, packaging of fruits and vegetables,processingmethods,machineryusedfortheprocess,advantagesandlimitationsof the processes.Commodity pretreatments- pre-cooling, chemicals, prepacking, cleaningandgrading.

UNITIIIProductspreparedfromfruitsandvegetables

Fruit beverages: fermented/non-fermented, processing technology for manufacturing of fruit juices, pulp, RTS beverage, nectars, squash, syrups, cordials, Carbonated.Fermented fruits and vegetables products like sauerkraut, pickles, wines etc.

Freezinganddehydratedfruitsand vegetables- different frozenfruit baseddesserts, driedanddehydarated fruits and vegetable products- wafers, soup powders, dried leafy vegetables,pickles, sauerkraut and papad.

UNITIVValueaddedfruitsandvegetable products

Commercial processing of major fruits and vegetables (canning, jam, jellies, marmalade, purees, concentrates, preserve, candy, toffee/bar etc.).Drying and dehydrationtechnologyof fruits and vegetables: preparation ofraisins, anardana, dried fig, dried leafy vegetables, juice powders, flakes, wafers, chips etc.Tomato paste, ketchup, sauce, puree, soup, chutneyetc.

UNITVBy-productsutilization andwastemanagement

UtilizationofBy-products:pectinextraction,vinegarproductionfromfruit andvegetable waste, Wastedisposal: Physical, Chemical&Biological methods;Economicalaspectsof waste treatment and disposal.

Valorisationofbyproductsinfoodindustry,pharmaindustry,biotechnology.

TEXTBOOKS:

1. Srivastava,R.P.andKumar,S.:FruitandVegetablePreservation:Principlesand Practices. International Book Distributing Co. Lucknow (2nd Edition 1998).
2. Girdharilal and Siddappa, Preservation of Fruits and Vegetables, Kalyani Publishers, 2001.
3. Subalakshmi, G and Udipi, SA: Food processing and preservation, 1st Ed. New Age International (P) Ltd. 2006

REFERENCES:

1. Cruees,W.V.CommercialfruitsandVegetableproducts,AgrobiosPublishers,2009
2. Desrosier NWand Desrosier JN: The TechnologyOfFoodPreservation, 4thEd. CBS Publishers and Distributors, New Delhi. 2006

WEBOGRAPHY

1. https://www.foodtown.com/articles/select-fresh-fruits-vegetables
2. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111423
3. http://wiki.zero-emissions.at/index.php/Peeling_in_food_industry
4. http://www.agritech.tnau.ac.in/postharvest/fpo_spec.html
5. http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5858
6. https://www3.epa.gov/ttn/chief/ap42/ch09/final/c9s08-2.pdf
7. :http://www.madehow.com/Volume-4/Raisins.html#ixzz6d7LmmHcC
8. http://www.phdmsme.in/uploaded_files/project_report/1536148322_327.pdf
9. https://medium.com/@luolaner521/several-methods-of-making-dried-figs-cea083e2d01
10. http://www.ticomachine.com/faq/fruit-juice-powder-production.html
11. https://www.dimasharif.com/fruit-wafers/
12. **https://onlinelibrary.wiley.com/doi/10.1111/1541-4337.12330**
13. https://www.intechopen.com/books/pectins-extraction-purification-characterization-and-applications/extraction-and-purification-of-pectin-from-agro-industrial-wastes
14. https://www.environmentalpollution.in/waste-management/hazardous-waste/how-to-treat-hazardous-waste-physical-chemical-and-biological-treatment/6741slideshare.net/mujahidhussain63/physical-methods-of-waste-disposal-mujahid-hussain-12

FRUITSANDVEGETABLESPROCESSING PRACTICAL

Code:21FPRV0539 Credit: 4 Contact Hours:4 Marks:100

Course Objectives:

- Tounderstandthetechnologyforpreservationoffruitsand vegetables
- Toprovideknowledgeaboutqualitytestingoffruitsand vegetables.

SpecificLearning Outcomes:

Aftercompletionofthiscourse,thestudentswill be able

- toknowthedifferenttypesofprocessedfruits&vegetables products.
- makedifferent processedfruit &vegetablebasedproductswithqualityassuranceand safety.

Practical

1. Peelingandcuttingoffruitsandvegetables
2. ExtractionandpreservationofFruitJuices.
3. Exerciseongradingandsortingoffruitsandvegetablestheirfunctionality
4. TestingPectininfruitjuicesand pulp.
5. PreparationoffruitRTSbeverageandevaluationofitsquality
6. Preparationoffruitsquashandcordial.
7. Preparationoffruitjamandevaluationofits quality
8. Preparationoffruitjelly/marmalade
9. Preparationoffruitpreserveandcandy
10. Preparationoffruitbar/toffee
11. Preparationofdehydrated fruitsand vegetables
12. Preparationofpickle/mixedpickle
13. Preparationoftomatoketch-up,sauce&chutney
14. Visittofruitprocessing industry
15. Visit tovegetableprocessing industry

DRYING TECHNOLOGY

Code:21FPRV0540 Credit:3 ContactHours/week:3 Marks:100

Course Objectives:

- Tounderstandtheconceptandprincipleoffood drying
- Toprovideknowledgeabout machineriesusedfordrying/dehydrationoffoods.
- Tohighlightthefactorsinfluencingdrying/dehydrationoffoods

SpecificLearning Outcomes:

After completionofthiscourse,thestudentswill beableto

- knowthecharacteristicsandpropertiesofdehydratedfoodsfamiliar with
- various methods ofdrying to improve the shelf lifeApplythe
- knowledge to fabricate/manufacture dehydrated food products

UNITIBasicsof Dehydration

Drying meaning, Principles of drying, Theories of drying, Water content in foods and its determination,differencebetweendryinganddehydration,conventionalandmodernmethods ofdrying,advantagesand limitationsofsun/solardrying,characteristicsofdriedproductsand its quality.

UNITIIMechanicaldrying

Fundamentals of cabinet drying, Mass and Heat balances in dryers (batch and continuous) (simpleproblemsonly),descriptionofbatchandcontinuousdryers,VacuumandDrumdriers, Application in Food industry.

UNITIIISprayDrying ofFoods

Fundamentals, Nozzles, Rotaryatomizersandtwofluid feeds, Interactionofdropletswithair, Drying of droplets with soluble and insoluble solids, Microstructure of spray dried products, Reconstitution, Foam spray drying, Applications in the Food industry.

UNITIVFreezeDryingofFoods

Fundamentals of freeze drying,Freezing and drying steps, Structural changes and volatile retention during freeze drying, Freeze dehydrationrelated processes: prefreezing, preconcentration, condensation, defrosting, Industrial freeze driers, Atmospheric freeze drying, Applications in food industry

UNITVOtherDryingMethods

Fluidised beddrying,BatchandContinuousdryers,Pneumaticdryer,tunneldrier,kilndrier, microwave drying principle, process and practice, Advantages and limitations,Applications in food industry.

Practical

1. Exerciseondifferenttypesofdryingmethodsusedinfood industry.
2. Preparationofsundriedvegetableproductsand evaluationofitsquality
3. Preparation of dehydrated vegetable products using solar drier and evaluation of itsquality
4. Preparationofdehydratedfruitproductsusingcabinetdrierandevaluationofitsquality
5. Preparationofdehydrated fruitproductsbyosmoticdehydration
6. Preparationoffruitjuicepowdersbyspraydrying
7. Preparationoffreezedried productsand evaluationofits quality
8. Preparationofdehydratedvegetableproductsbyusingmicrowaves
9. Visittofruitjuicepowderingunit
10. Visittovegetabledehydrationunit
11. Visit tograindryingunit

TEXTBOOKS

1. Desoresier,W.N.andJames,N.(1987).“TheTechnologyofFoodPreservation”.New Delhi:CBS Publishers and Distributors.
2. Girdharilal,G.S. and Siddappa (1986). “Preservation of Fruits and Vegetables”.New Delhi:Publications and Information Division, ICAR.
3. Subalakshmi,GandUdipi,S.A.(2001),“Foodprocessingandpreservation”.NewAge International Publishers, New Delhi.
4. Manay, N.S. Shadaksharaswamy, M. (2004), “Foods- Facts and Principles”, New age international publishers, New Delhi.

REFERENCES

1. Gould,G.W.(2012),“NewMethodsoffoodpreservation”,SpringerScience& Business Media.
2. ArunS.Mujumdar(2006),“HandbookofIndustrialDrying”,3rdEdition,CHIPS (2006)

WEBOGRAPHY

1. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=868

2. http://ecosalon.com/diy-sun-drying-food-how-to-literally-sun-dry-fruits-and-vegetables/

3. https://www.slideshare.net/mobile/RakhiVishwakarma/solar-food-drying-32041642

4. https://www-researchgate-net.cdn.ampproject.org/v/s/www.researchgate.net/figure/Advantages-and-disadvantages-of-the-four-types-of-solar-food-driers_tbl4_237503256/amp?amp_js_v=a2&amp_gsa=1&usqp=mq331AQFKAGwASA%3D#aoh=15976563314525&amp_ct=1597656374397&csi=1&referrer=https%3A%2F%2Fwww.google.com&amp_tf=From%20%251%24s&ampshare=https%3A%2F%2Fwww.researchgate.net%2Ffigure%2FAdvantages-and-disadvantages-of-the-four-types-of-solar-food-driers_tbl4_237503256

5. https://www.motherearthnews.com/real-food/drying/sun-drying-food-techniques-zmaz75jazgoe

6. https://www.slideshare.net/mobile/RakhiVishwakarma/solar-food-drying-32041642

7. https://www.accessagriculture.org/solar-drying-chillies

8. https://www.pharmapproach.com/spray-dryer/

9. https://www.slideshare.net/mobile/akankshashrivastava3/spray-drying-54159904

10. https://www.slideshare.net/mobile/prreeem/freeze-drying-42385640

11. https://www.slideshare.net/mobile/MonikaTambakhe/freeze-drying-ppt

12. https://link.springer.com/article/10.1007/s12393-012-9048-x

NOVELFOODPROCESSINGTECHNOLOGIES

Code:21FPRV0541 Credit:3 ContactHours/week:3 Marks:100

Course Objectives:

- Toknowaboutnewdevelopmentsinfoodprocessing
- Toprovideknowledgeaboutconceptandprinciplesofnoveltechniques
- Tohighlighttheapplications infoodprocessing

SpecificLearning Outcomes:

After completionofthiscourse,thestudentswill beableto

- know the application and use of the technology in food processing
- explain the concepts and process involved in novel food processing
- Apply the knowledge to develop/modify food products

UNITIFood Irradiation

Irradiation: meaning, source, principle- types of irradiation, process, advantages, limitations, Food applications

UNITIIMembraneseparation process

Membrane Technology-process, types: Micro-filtration, Ultra-filtration, Nano-filtration and Reverse Osmosis-advantages and limitations, Food applications

UNITIIIHighpressure processing

High Pressure processing: Concept-Equipment for HPP Treatment-Mechanism of Microbial Inactivation.
FactorsthataffecttheefficacyofHPP

UNITIVHurdletechnology

Basics of hurdle technology Mechanism, Newer Chemical and Biochemical hurdles- organic acids–Plantderivedantimicrobials–Antimicrobialenzymes–bacteriocins–chitin/chitosan, Advantages and limitations

UNITV GeneticallyModified foodsand functionalfoods

GMO meaning, principle and application, advantages and limitations; functional foods meaning and the concepts, advantages and limitations.

TEXTBOOKS

1. Da-WenSun,“EmergingTechnologiesforFoodProcessing”,Academic press/ Elsiever, London, UK,2005.

REFERENCES

1. LeistnerL.andGouldG.HurdleTechnologies–Combinationtreatmentsforfood stabilitysafetyandquality, Kluwer Academics/PlenumPublishers, NewYork(2002)
2. P Richardson, “Thermal Technologies in Food Processing”, Campden and Chorleywood Food Research Association, UK, Woodhead Publishing Limited 2001
3. GustavoV.Barbosa-Canovas,MariaS.TapiaandM.PilarCano,“NovelFood Processing Technologies”. CRC Press, 2004.

WEBOGRAPHY

1. https://apps.who.int/iris/bitstream/handle/10665/38544/9241542403_eng.pdf
2. https://www.sathyabama.ac.in/sites/default/files/course-material/2020-10/UNIT-V_8.pdf
3. http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000015FT/P000068/M000148/ET/14616619928et.pdf
4. https://www.ijcmas.com/vol-4-7/Aditya%20Pundhir%20and%20Nida%20Murtaza.pdf

SEMESTERVI

FOODHYGIENEANDSAFETY

Code:21FPRV0643 Credit:3 Contact Hours/week3 Marks:100

Course Objectives:

- Tounderstandthehygienicpractices infoodindustry.
- Tomaintainpersonalhygieneandto checkfoodsafetyaspects.

UNITIFood Safety

Definition, principles of food safety,need and importance of food safety in food industries; Factorsaffectingfoodsafety;sourceofcontamination,foodbornediseases,testforfoodsafety.

UNITIIIHygienePracticesandsanitationinfood industry

Introduction, necessity, personnel hygiene, sanitary practices, management and sanitation, safety at work place.Importance of sanitation, application of sanitation to food industry, microorganism control and microbial growth.

Foodbornediseases- types,foodbornepathogens,infections.

UNITIIIHygieneand food handling

Purchasingandreceivingsafefood,foodstorage,sanitary proceduresinfoodpreparation, serving and displaying of food, special food operations.

UNITIVEnvironmentalSanitation

Locationand layoutofpremises,constructionaldetails,sanitaryrequirementsforequipments, guidelines for cleaning equipments, cleaning procedures, pest control, water supply, storage and waste disposal, environmental pollution.

Sanitaryrequirementsand guidelines.

UNITV SanitationregulationsandStandards

Introduction,regulatoryagencies,controloffoodquality,localhealthauthority.Food sanitation check lists given by FSSAI.

TEXTBOOKS:

1. Roday S,(2011)(2002),“FoodHygieneandSanitation”,McGrawHill Publishing Company Limited.
2. H.L.M.Lelieveld,JohnHolah,DavidNapper,(2014),“HygieneinFoodProcessing: Principles and Practice”, Elsevier Publications.

REFERENCES:

1. Marriott,Norman(2013),“PrinciplesofFoodSanitation”,SpringerScience&Business Media Publishing.

WEBOGRAPHY

1. https://www.sciencedirect.com/topics/food-science/food-hygiene#:~:text=Food%20hygiene%20constitutes%20the%20cornerstone,greatest%20risk%20for%20human%20health.&text=Guidelines%20on%20the%20Application%20of,%2Dto%2DEat%20Foods%3B%20and
2. https://www.unimed.edu.ng/oer.unimed.edu.ng/LECTURE%20NOTES/1/1/SUNDAY-OLANREWAJU-Basics-of-food-safety-and-HygieneOER1037206.pdf
3. https://www.slideshare.net/AbiodunOladipo/food-hygiene-and-safety-lecture
4. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_science_students/foodhygieneptii.pdf
5. https://www.intracen.org/uploadedFiles/intracenorg/Content/Exporters/Exporting_Better/Quality_Management/AssetPDF/FINAL%20Food%20safety%20and%20GHP%20-%20Gambia(2).pdf
6. https://www.scribd.com/presentation/479849314/Food-Hygiene-Lecture-ppt

FOODPLANTMAINTENANCEAND MANAGEMENT

Code:21FPRV0644 Credit:4 ContactHours/week:4 Marks:100

Course Objectives:

- Tounderstandtheimportanceofplantmaintenanceinqualitycontrol
- Toprovideknowledgeabout foodhygiene,sanitationandsafetyinunit operations • To highlight the significance of cleanliness in quality management

SpecificLearning Objectives:

After completionofthiscourse,thestudentswill beableto

- Outlinethepitfallsinmaintaininghygienicconditionsinthefoodplant • Know causes of contamination/pollution in the food plant
- Describethemethodstobefollowedtocontrol/preventcontaminationinfood plant

UNITIPlantMaintenance

Plantmaintenanceprogram;Roleofmaintenancestaffandplantoperators;Preventivemaintenance;Guidelinesforgoodmaintenance&safetyprecautions;Lubrication&lubricants.

UNITIIPlant Safety

The objective of safety, health & environment; Cost of safety; Accident investigation report; Safety promotional activity; Environmental pollution and its control.

Hazardsinmanufacturingplant-respiratoryprotection,hazardcommunication,controlofhazardous energy, powered industrial trucks, machinery and machine guarding.

Methodstoimproveworkplacesafety

UNITIIIPlant Hygiene

Hygieneand sanitationrequirement infoodprocessing industries;Cleaning,sanitizing&pest control in food processing; storage and service areas.

UNITIVPlant Sanitation

Basicprinciplesandproblems,cleaningandsterilizingagents,methodsofsterilization, methods of cleaning, choice of cleaning methods, introduction to special cleaning methods.

UNITVPlantUtilities

Principalplant utilities-processwater,processsteam,electricpowerformotorsand lightingand fuel.

Indian Factories Act on safety; HACCP; Desirable safety features of some food processingequipment; Personal protective equipment; Safety from adulteration of food.

TEXTBOOKS

1.Michael M. Cramer (2006). Food Plant Sanitation: design,maintenance, and good manufacturing practices,CRC Press, ISBN: 0849341973, 9780849341977.

REFERENCES:

1. Zacharias B. Maroulis, George D. Saravacos, (2007), “Food Plant Economics”, CRC Press Publishers.
2. GeorgeDSaravacos,A.E.Kostaropoulos.(2002).HandbookofFoodProcessing Equipment, Food engineering series by Springer.

WEBOGRAPHY

1. https://coastapp.com/blog/preventive-maintenance/
2. https://www.highspeedtraining.co.uk/hub/riddor-reporting-accident-at-work/
3. https://www.faa.gov/about/initiatives/sms/explained/components/
4. https://www.rentokil-pestcontrolindia.com/food-processing/10-ways-to-ensure-food-safety/
5. https://www.ncceh.ca/sites/default/files/Food_Contact_Surface_Sanitizers_Aug_2011.pdf
6. https://egyankosh.ac.in/bitstream/123456789/62284/1/3%20Sanitary%20and%20Hygienic%20Requirement%20in%20Food%20Processing%20Industry%20%28Write%20Up%29.pdf
7. https://ubblab.weebly.com/uploads/4/7/4/6/47469791/principles_of_food_sanitation,_5th_ed.pdf
8. https://www.slideshare.net/GautamKumar143/special-cleaningprogram
9. https://www.respiratorshop.co.uk/blog/selecting-the-right-ppe-for-food-process-industry
10. https://www.mpofcinci.com/blog/guide-to-sanitary-and-hygienic-design/

PROJECTPREPARATIONANDMANAGEMENT

Code:21FPRV0645 Credit:4 ContactHours/week:4 Marks:100

Course Objectives:

- Tounderstandthebasicconceptsofprojectmanagement.
- To provide knowledge onbusinessproposalspreparation
- Tohighlighttheimportanceofplanning andevaluationofproject.

SpecificLearning Outcomes

Aftercompletionofthiscourse,thestudentswillbeableto

- Familiar with the steps in project management.
- Knowthebasicsinpreparationofeffectiveproposals.
- Evaluate the technical feasibility,financial viability, market acceptability and social desirability of projects.

UNITI IntroductiontoProject Management

Basicconcepts-planandprogramme,projectplanning,proposalandrojectplanningmatrix,project cycle, project management, characteristics.

Projectidentification, methodsandtechniques,basicsandsupportivedocumentrequiredforaproject, common format of a project proposal.

Projects-Projectideasandpreliminaryscreening.Developments -Project planningtoProject completion - Pre-investment phase, Investment phase, operational phase - Governmental Regulatory framework. Capital Budgeting.

UNITIIStagesofProjectManagement

Fivestagesofprojectmanagement-projectinitiation,projectplanning,projectexecution,project monitoring and project close.

Opportunity studies - prefeasibility studies,functional studies or support studies,feasibility studyexpansionprojects,dataforfeasibilitystudy.MarketandDemandanalysis,Market

Survey,Demandforecasting.Technicalanalysis-Materialsandinputs,ChoiceofTechnology, Product mix, Plant location, capacity, Machinery and equipment.

UNITIIIAppraisal Process

Concepts. Time value of money - Present and future value. Appraisal criteria - Urgency, Payback period, Rate of return, Debt service coverage ratio, Net present value, Benefit cost ratio, Internal rate of return, Annual capital charge, Investment appraisal in practice.
Performance appraisal process- establish performance standards, communicate performancestandards, measure actual performance, compare actual performance, discuss, decide andfollow up.

UNITIVRiskandProfitabilityAnalysis

Risk analysis- Measures of risk, Sensitivity analysis, and Decision tree analysis. Means of financing, Term Loans, Financial Institutions. Cost of capital. Profitability - Cost of Production, Break-even analysis. Assessing the tax burden and financial projections.

Utilisationoffunds, followupprogrammes, achievementoftargets.

UNITVProjectPlanning,Implementation,And Control

Forms of Project Organization, Project Planning, Implementation, and Control – Network construction, CPM, PERT, Development of Project schedule, Crashing of Project Network. Introduction to Foreign collaboration projects - Governmental policy framework, Need for foreign technology, Royalty payments, Foreign investments and procedural aspects.

Projectreport-preparation,communicationandsubmission.

TEXTBOOKS:

1. M.R. Gopalan, (2015). Project Management Core Textbook,(Paper Back) 2nd edition, Wiley India.
2. GaryHeerkens(2013).ProjectManagement,SecondEdition,Mc.GrawHill Education, 2013.

REFERENCES:

1. PrasannaChandra,(2014).Projects:Planning,Analysis,Selection,Financing,Implementation, 8thEdition, TataMcGraw HillPublishing CompanyLtd.,New Delhi.
2. P.Gopalakrishnan and V.E.RamaMoorthy (2014). Text Bookof Project Management,1stEdition,MacmillanIndiaLtd.,NewDelhi.
3. JohnM.Nicholas,HermanSteyn,(2016).ProjectManagementforEngineering, Business and Technology, 5th Edition, Routledge.

WEBOGRAPHY

1. https://hahuzone.com/project-life-cycle#:~:text=According%20to%20the%20UNIDO%20manual,alternatives%20and%20preliminary%20project%20selection&text=Project%20appraisal%20and%20investment%20decision%20(appraisal%20report)
2. https://kissflow.com/project/five-phases-of-project-management/
3. https://www.lucidchart.com/blog/the-4-phases-of-the-project-management-life-cycle
4. https://blog.arkieva.com/demand-forecasting/
5. https://twproject.com/blog/project-organizational-structures-project-management/
6. https://bbamantra.com/market-and-demand-analysis/

FOODPRODUCTDEVELOPMENTANDVALUE-ADDED PRODUCTS

Code:21FPRV0647 Credit:2 Hours:2 Marks:50

Course Objectives:

- Toacquireknowledgeontheimportanceofconsumerresearch,financeandcomm unication.
- Tounderstandvariousaspectsoffoodproductdevelopment

Learning Outcome:

- Tounderstandandknowvariousaspectsoffoodproductdevelopment underlingfood science and technology and consumer research.
- Theymaybeableto appraisethe featuresandtrendsofspecific foodproductwithin an appropriate market settings

UNITI

New food Products development, Factors influencing product development, consumer-oriented product development, Impact of technology and Market place influence.

UNITII

How to develop a new product?. Phases in product development. Statistical experimentalmethods. Modelling for process and recipe.

UNITIII

Refining the screening procedure for the products, Sensory Evaluation, Shelf-life testing,Product integrity and conformance to standards. Test Marketing; evaluating results andanalysing.Packaging, design graphic and labelling.

UNITIV

Value addition inplant foods- Garlic, Ginger, Dragonfruit, BitterGourd, Lichi, Moringa,Coconut, Mushroom, Seaweed and related innovative approaches in foods.

VeganYoghurt-OatMilkYoghurt,almond milk yoghurt,coconumilk yoghurt,soybasedand hemp yoghurt. Kefir, Container milk, Fudge.

UNITV

Valueadditioninanimalfoods–GoatMilk, Cheese, Butter,IceCream, Yoghurt.

Value added meat and poultryproducts: Chicken nuggets, Saussages, Patties, Quail meatproducts, Processing and preservation techniques.

REFERENCE:

1. FullerG.W.(1994).NewFoodProduct Development:FromConceptto MarketPlace,New York, CRC Press.
2. Man C.M.D and James A.A. (1994). Shelf-life Evaluation ofFoods. London: BlackieAcademic and Professional.
3. OlickleJ.K.(1990).NewProductDevelopmentandValueadded.Canada:FoodDevelopme nt Division Agriculture.
4. InternationalJournalofFoodScienceandTechnology

ELECTIVEPAPERS

ELECTIVE-1

FUNCTIONALFOODSAND NUTRACEUTICALS

Code:21FPRV05E1 Hours/week:3 Credits:3 Marks:100

Course Objectives

Toenablethe students

- ToUnderstandthebasicsoffunctionalfoodsandnutraceuticals
- To studythe significance of nutraceuticals
- Toidentifynew strategiesformarketingoftraditionallyknownnutraceuticals

UNITI

FunctionalFoods-HistoricalPerspective,Definition,Classificationbasedonthesources– Animal, Plant and Microbial, Health benefits

Nutraceuticals – Definition, Classification Based on Food sources – Animal, Plant andMicrobial, Health benefits

UNITII

Phytochemicals–Classification–Nutrients,Herbals,DietarySupplements;Sources,Effect of Processing.

Developmentofdesignedfoods–Herbalsupplementsand DietarySupplements

UNITIII

Prebiotics: Definition,Characteristicsof prebioticmicro-organisms,Sources; Prebioticfood products - Natural and Processed; Guidelines of Prebiotic Safety

Probiotics: Definition,Characteristics of prebioticmicro-organisms,Sources; Probioticfood products - Natural and Processed; Guidelines of Probiotic Safety

Postbiotics: Definition, Characteristics of prebiotic micro-organisms, Sources; Probioticfood products - Natural and Processed; Guidelines of Probiotic Safety

UNITIV

FunctionalIngredients–

Extraction/Purificationoflycopene,isoflavonoids,prebiotics,probiotics, glucosamine and phytosterols. Manufacturing of dietary supplements in theform of liquid, rehydration powder and mix.

UNITV

Enrichment and Fortification in different foods – Dairy Products, Beverages, Proteinmixes, Infant Formulas, Value addition in different processed food products.

REFERENCE

1. RobertE.CWildman.HandbookofNutraceuticalsandFunctionalFoods,CRC Press
2. Bagchi. D, Preuss. H. Gand Swaroop. A(2016). Nutraceuticals and FunctionalFoodsin human health and disease Prevention. Taylor and Francis Group.
3. Lockwood B (2007),Nutraceuticals–A Guidefor healthcare professionals,secondedition, Pharmaceutical Press.
4. JohnsonIandWilliamsonG(2003),Phytochemicalfunctionalfoods,CRCPress,BocaRaton , Boston, New York, Washington, DC.
5. NutraceuticalandFunctionalFoodComponents,CharisGalanakis,AcademicPress
6. Functional FoodsandNutraceuticals(Food ScienceTextSeries),Rotimi E.Aluko,Springer; 2012 edition

WEBOGRAPHY

1. https://www.cambridge.org/core/services/aop-cambridge-core/content/view/S0007114502002337#:~:text=The%20concept%20of%20functional%20foods,associated%20with%20specific%20health%20benefits.
2. https://pubmed.ncbi.nlm.nih.gov/17323283/
3. https://www.researchgate.net/publication/343846825_Nutraceuticals_History_Classification_and_Market_Demand
4. https://pubmed.ncbi.nlm.nih.gov/12738185/#:~:text=The%20term%20functional%20ingredient%20is,drugs%2C%20nutrients%20and%20food%20additives.
5. https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-distinguishing-liquid-dietary-supplements-beverages

ELECTIVE–2

TECHNOLOGYOFSEAFOODPROCESSING

Code: 21FPRV05E2 **Credits: T3+P0** **Hours/week:3**

Marks:100Course Objectives

- To knowtheimportance offisheryindustry.
- Toknowthe compositionaltechnologicalaspectsoffish.
- Tostudyprocessedfishproduct.

UNITIIntroductiontoSeafoodprocessing- ChillingandFreezingof fish

StatusoffisheryindustryinIndia.

Relationship betweenchilling and storage life, MAP, generalaspectsoffreezing, freezingsystems, (air, blest freezing, plate or contact freezing spray or immunization freezing)freezing on board, onshore processing changes in quality in chill and frozen storage andthawing.

UNITIIFish Curing

Drying and salting offish, water activityand self- life. Salting processes, salting methods(brining,picking,kenchcuring,gaspcuring).Typesofsalts,driedandsaltedfishproducts.Pindang, fish wood, dried shrimp.

UNITIIISmoking

Smoking- smoke production, smoke components quality, safety and nutritive value ofsmoked fish. Processing and equipment, pre-smoking process, smoking process control,traditional chimney kiln, modern mechanical fish smoking klin.

Examplesofsmokedanddriedproducts.

UNITIVCanningofFish

Principles of canning, classification of PH groupings, effect of heat processing on fish,storage of canned fish. pre-processes operations, cannery operations for specific cannedproducts(Tuna,Sackerel,Sardines) .

UNITVFishery By-products

Fishproteinconcentrates(FPC),Fishproteinentrets(FPE),FishproteinHydrolysis(FPH),Fermented fish sauce and paste.

Crabs,prawns,Lobsters,shrimps,shellfishproducts.

RELATEDEXPERIENCES

1. Visit toseafoodprocessingunits.

RELATEDREFERENCE BOOKS

1. HallGM, FishprocessingtechnologyVCHpublishersINC.NY.1992.

2. SenDP,Advancesinfishprocessingtechnology,alliedpublisherspvtltd.2005.

3. Shahidi F, Botta. JR, sea foods ,chemistry, processingtechnologyand quality, blackieacademic & professional London,1994.

WEBOGRAPHY

1. https://www.researchgate.net/publication/339788847_An_Introduction_to_Seafood_and_Recent_Advances_in_the_Processing_of_Seafood_Products#:~:text=Seafood%20is%20one%20of%20the,rich%20fish%2C%20molluscs%20and%20crustaceans.
2. http://www.fao.org/3/Y5013E/y5013e04.htm
3. https://www.britannica.com/topic/fish-processing/Curing#:~:text=The%20smoking%20process%20consists%20of,then%20partially%20dried%20on%20racks.
4. https://www.sciencedirect.com/topics/food-science/canned-fish#:~:text=Canning%20is%20one%20of%20the,temperature%20for%20a%20determined%20time.
5. https://agritech.tnau.ac.in/fishery/fish_byproducts.html#:~:text=The%20traditional%20fishery%20byproducts%20are,of%20fish%20and%20fish%20waste.

ELECTIVE-3

FOOD ENGINEERING

Code:21FPRV05E3 Credits: T3+P0 Hours/week:3

Marks:100Course Objectives:

- Tounderstandtheprinciplesofunitoperation.
- Toacquaintwithfundamentalsoffoodengineeringanditsprocess.
- Tounderstand thebasicsofdesigning offoodplant andsystems

UNITI Introduction

Concept of unit operation, units and dimensions, unit conversions, dimensional analysis,man and energy balance, related named.

UNITIIDesign ofFood Plant

Importantconsiderationsfordesigningoffoodplants,typesoflayoutprinciplesandequipment's, used in food industry.

UNITIIIPhasesofLiquidMechanism

Liquidtransportsystems,propertiesofliquids,Newton'slawofviscosity.Conceptsand selection ofrefrigerant, description ofa refrigeration cycle, frozen food storage. Heatand mass transfer, systems for heating and cooling food products, thermal properties offood, mode of heat transfer.

UNITIVSteam,EvaporationandDehydration

Generationsofsteam,designofsingleevaporators,DehydrationSystemdesign.

UNITV Psychrometric

Propertiesofdryair, water vapour,Air vapour,mixture, psychrometriccharts.

REFERENCEBOOK

1. Rao,DG,2010,FundamentalsofEngineering,P41kerning private,Ltd.
2. SinghRPandHeldmanDR,1991,2003,2009,Introductiontofoodengineering,Academic press,2nd,3rd and 4th edition.
3. Rao,CG,2006,EssentialsoffoodprocessingengineeringB.S publications.
4. FellowP.1988,FoodProcessingTechnology.

WEBOGRAPHY

1. https://www.slideshare.net/mobile/mahmudulmithun/unit-operations-99244122
2. https://www.slideshare.net/UsamaKhan106/the-psychrometric-chart-theory-and-application
3. http://ecoursesonline.iasri.res.in/course/view.php?id=529
4. https://www.slideshare.net/bhavik22/properties-of-fluids-47900406
5. https://www.slideshare.net/MamtaSahurkar/evaporation-128676372
6. https://www.slideshare.net/HimanshuYadav18/steam-application