

# Choice Based Credit Based System

## **Scheme & Syllabus of Master of Technology- Food Technology/ (M. Tech of Food Technology)**

**Batch 2018  
(Minor revision on 29/07/2019)**



**By**

**Board of Study (Food Science and Engineering)  
(Main Campus)**

Department of Food Science and Technology  
IK Gujral Punjab Technical University

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**Master of Technology in Food Technology (M Tech of Food Technology)/**

It is a Post Graduate (PG) Programme of 2 years duration (4 semesters)

**Eligibility for Admission:** B. Tech./ B.E. (Food Engineering/ Food Technology/ Food Engineering & Technology/ Food Process Engineering/ Food Process Technology/ Dairy Technology/ Dairy Engineering/ Food Biotechnology/ Agri. Process Engineering/ Agri. Engineering/Biotechnology) or any equivalent degree with at least 55% marks.

**OR**

M.Sc. (Food Science/ Food Technology/ Food Science and Technology/ Food Processing and Technology/ Biotechnology) or any equivalent degree with at least 55% marks.

**Courses & Examination Scheme:**

Program Core (PC)	Program Elective (PE)	Open Elective (OE)	Research	Total Credits
45	10	04	26	85

**Semester First**

Corse Code	Course Title	Type	Load Allocation			Marks Distribution		Total	Credits
			L	T	P	Internal	External		
MTFT-511-18	Advances in Food Engineering	PC	4	0	0	40	60	100	4
MTFT-512-18	Advances in Food Analysis	PC	4	0	0	40	60	100	4
MTFT-513-18	Food Safety and Quality Assurance	PC	4	0	0	40	60	100	4
MTFT-514-18	Advances in Post-harvest Technology of Fruits and Vegetable	PC	4	0	0	40	60	100	4
MTFT-515-18	Lab-I (Advances in Food Analysis)	PC	0	0	4	30	20	50	2
MTFT-516-18	Lab-II (Food Safety and Quality Assurance)	PC	0	0	4	30	20	50	2
MTFT-517-18	Lab-III (Advances in Post-harvest Technology of Fruits and Vegetable)	PC	0	0	4	30	20	50	2
<b>Total</b>			<b>16</b>	<b>0</b>	<b>12</b>	<b>250</b>	<b>300</b>	<b>550</b>	<b>22</b>

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**Semester Second**

Course Code	Course Title	Type	Load Allocation			Marks Distribution		Total	Credits
			L	T	P	Internal	External		
MTFT-521-18	Advanced Food Processing Technology	PC	4	0	0	40	60	100	4
MTFT-522-18	Advances in Cereal Science and Technology	PC	4	0	0	40	60	100	4
MTFT-523-18	Novel Food Packaging	PC	4	0	0	40	60	100	4
MTFT-524-18	Lab-IV (Cereal Science & Technology)	PC	0	0	4	30	20	50	2
MTFT-525-18	Lab-V (Novel Food Packaging)	PC	0	0	4	30	20	50	2
MTFT-526-18-528-18	Program Elective-1 (Theory)	PE	4	0	0	40	60	100	4
MTFT-529-18-531-18	Program Elective-1 (Lab.VI)	PE	0	0	4	30	20	50	2
<b>Total</b>			<b>16</b>	<b>0</b>	<b>12</b>	<b>250</b>	<b>300</b>	<b>550</b>	<b>22</b>

**Programme Elective-I \***

Course Code	Course Title	Type	Load Allocation			Marks Distribution		Total	Credits
			L	T	P	Internal	External		
MTFT-526-18	Food Additives and Contaminants	PE	4	0	0	40	60	100	4
MTFT-527-18	Nutraceuticals and Functional Foods	PE	4	0	0	40	60	100	4
MTFT-528-18	Technology of Frozen Foods	PE	4	0	0	40	60	100	4
MTFT-529-18	Lab-VI (Food Additives and Contaminants)	PE	0	0	4	30	20	50	2
MTFT-530-18	Lab-VI (Nutraceuticals and Functional Food)	PE	0	0	4	30	20	50	2
MTFT-531-18	Lab-VI (Frozen Food Technology)	PE	0	0	4	30	20	50	2

Note: \* Select any one subject from Elective-I. The elective subject for theory & practical will be same.

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**Semester Third**

Course Code	Course Title	Type	Load Allocation			Marks Distribution		Total	Credits
			L	T	P	Internal	External		
MTFT-611-18	Milk and Milk Products Technology	PC	4	0	0	40	60	100	4
MTFT-612-18	Lab-VII (Milk and Milk Products)	PC	0	0	4	30	20	50	2
MTFT-613-18	Seminar	PC	0	0	2	30	20	50	1
MTFT-614-18	Open elective <sup>#</sup>	OE	4	0	0	40	60	100	4
MTFT-615-18-617-18	Program Elective-II	PE	4	0	0	40	60	100	4
MTFT-618-18	Dissertation-I	RP	0	0	10	60	40	100	10
	<b>Total</b>		<b>12</b>	<b>0</b>	<b>16</b>	<b>240</b>	<b>260</b>	<b>500</b>	<b>25</b>

**# open elective:** The student is required to register for one “Open Elective” paper (in Semester III) of his/her choice from any department other than the parent department

**Programme Elective-II \*\***

Course Code	Course Title	Type	Load Allocation			Marks Distribution		Total	Credits
			L	T	P	Internal	External		
MTFT-615-18	Food Rheology and Texture	PE	4	0	0	40	60	100	4
MTFT-616-18	Bio Process Engineering	PE	4	0	0	40	60	100	4
MTFT-617-18	Advances in Meat, Fish, Poultry and Egg processing	PE	4	0	0	40	60	100	4

Note: \*\* Select any one subject from Elective-II.

**Semester Fourth**

Course Code	Course Title	Type	Load Allocation			Marks Distribution		Total	Credits
			L	T	P	Internal	External		
MTFT-621-18	Dissertation-II	RP	0	0	32	60	40	100	16
	<b>Total</b>		<b>0</b>	<b>0</b>	<b>32</b>	<b>60</b>	<b>40</b>	<b>100</b>	<b>16</b>

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**Important Notes: -**

1. The credit requirement for the M. Tech (Food Technology) degree is 85 credits inclusive of the 10 elective course credits.
2. The department will offer the following open elective courses for the students of other Engineering departments:
  - i. Food Safety and Quality Assurance
  - ii. Advances in Food Analysis
3. Theory courses will be of 04 hours and practical will be of 04 hours duration per week. For all lecture courses, one credit per lecture/week/semester will generally be adopted. One laboratory hour per week per semester will be assigned half credit.
4. No elective course will be run unless the number of students registered for the elective course is five or more.
5. Each theory paper examination will be of 3 hours duration and practical examination will be of 4 hours duration.
6. A student is required to undertake a Research Project of 16 credits on a topic approved by the supervisor and the Departmental Research Committee (DRC). The student is required to prepare his/her research project synopsis and should make a presentation to the DRC before the commencement of the final examination of third semester.
7. The research project shall be evaluated by the external examiner at the end of the Semester IV.
8. The student is required to register for one "Open Elective" paper (in Semester III) of his/her choice from any department other than the parent department.
9. A Supervisor will be allotted by the Chairperson for every student in the beginning of third semester.

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**Program outcomes**

1. Ability to apply principles of food engineering in industry.
2. Understand, identify and analyze a problem related to food industry and ability to find an appropriate solution for the same.
3. Design, implement and evaluate a research based project to meet demands of the society.
4. Use appropriate techniques, skills, and modern tools in the food industry and in academic profession.
5. Understanding of professional, ethical, legal, security and social issues and responsibilities for entrepreneurship skills.
6. Ability to function effectively as an individual and in a group.

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**SEMESTER**

**THIRD**

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**MTFT-611-18: TECHNOLOGY OF MILK AND MILK PRODUCTS**

Total Marks: 100

L	T	P
4	0	0

**Objective:**

1. To illustrate the technologies of processing of milk and milk products.
2. To describe the different physico-thermal properties and their applications.
3. To elucidate the thermal processing of milk and quality changes therein.
4. To explain the hygiene and sanitation practices in milk plant.

**Course Outcome:** After the completion of the course, the students will be able to:

1. Understand the processes related to storage, processing and distribution of milk and milk Products.
2. Perceive the different properties of milk and milk products.
3. Apprehend the thermal processing of milk.
4. Grasp the technology of fat rich dairy products.
5. Comprehend the technology of condensed milk, dried milk, cheese, yoghurt and indigenous products will be understood.
6. Have knowledge regarding hygiene and sanitation practices in the milk and milk products industry.

**Course Content:**

**UNIT-I**

Technology of Market Milk: Dairy Industry in India: present status and scope; Milk: definition, composition and nutritive value; grading of milk; factors affecting composition of milk; physico-chemical properties of milk; FSSAI standards and legislations for market milk. Liquid milk processing: filtration/clarification; bacto-fugation; standardization; homogenization; pasteurization (LTLT, HTST); sterilization; UHT processing; aseptic packaging; storage and distribution. Technology of special milks: Technology of sterilized/ flavored milk, acidophilus milk, bulgarian milk, kumis, kefir; reconstituted & recombined milk, toned, double toned milk.

**UNIT-II**

Technology of fat rich dairy products: Cream: definition and legal standards, consumer cream products, standardization & production of cream, processing of cream (neutralization & pasteurization), butter: definition, butter-making process, overrun, yield, theories of churning, quality of butter, fat losses in cream & butter, defects in cream & butter. Ice-cream: definition, classification and composition of ice-cream, technological aspects of ice cream preparation, packaging, hardening, storage and shipping of ice cream.

**UNIT-III**

Technology of condensed and dried milk: Definition and legal standards for evaporated and condensed milks, methods of manufacture and physico-chemical properties of evaporated and condensed milk, concept of heat stability & its control, defects in condensed and evaporated milks, Quality of raw milk for dried milks, definition and legal standards for dried milks, milk drying system (film, roller, drum, spray, foam spray drying), method of manufacture of dried milks (WMP & SMP), defects in dried milk, Technology of yoghurt and cheese: Yoghurt - Definition and technology of yoghurt manufacturing, technology of different varieties of cheese manufacturing (cheddar & mozzarella), changes during ripening of cheese, yield of cheese; manufacture of processed cheese, defects in cheese, accelerated ripening of cheese.



**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**UNIT-IV**

Technology of indigenous dairy products: Introduction to traditional dairy products, khoa, channa, paneer, dahi, shrikhand, ghee, khoa and channa based sweets, miscellaneous traditional dairy foods, Dairy industry by-products and sanitation: By-products: introduction, definition, composition, Importance and food applications, whey protein concentrates & isolates, Dairy plant sanitation: hygiene in dairy industry, different types of cleansing/sanitizing agents and their applications, cleaning systems in dairy industry.

**Recommended Readings:**

1. Winton, A. L. and Winton, K. B. (2000). *Milk and Milk Products*: Agrobios, India.
2. Kuttu, C. I. and Khamer, S. (2004). *Milk Production and Processing*: Daya, Delhi.
3. Fox, P. F. and McSweeney, P. L. H. (1998). *Dairy Chemistry and Biochemistry*: Kluwer Academic, New York.
4. Kurmann, J. A., Rasic, J. L. and Kroger, M. (1992). *Encyclopedia of Fermented Fresh Milk Products: An International Inventory of Fermented Milk, Cream, Buttermilk, Whey and Related Products*: CBS Publications, New Delhi.
5. Davis, J. G. (1994). *Milk Testing: The Laboratory Control of Milk*: Agro Botanical, Bikaner.

**Mapping of course “Technology of Milk and Milk Products- MTF-611-18”outcomes and Program outcomes:**

<b>Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)</b>							
	<b>Program Outcome (PO)</b>						
		<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>Course Outcome (CO)</b>	<b>CO 1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>
	<b>CO 2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>
	<b>CO 3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>3</b>
	<b>CO 4</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>
	<b>CO 5</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>3</b>
	<b>CO 6</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**MTFT-612-18: Lab-VII (MILK AND MILK PRODUCTS QUALITY)**

Total Marks: 50

L	T	P
0	0	4

**Objective:**

1. To exemplify the quality of milk and milk products.
2. To depict the detection of adulterants in milk.
3. To demonstrate the manufacturing various dairy products.
4. To illustrate the quality of dairy products.

**Course Outcome:** After the completion of the course, the students will be able to:

1. Understand different methods of milk quality analysis.
2. Grasp the detection methods of adulterants in milk.
3. Apprehend the manufacturing of different dairy products.
4. Perceive the quality analysis of dairy products.

**Course Content:**

Analysis of milk: total solids, fat, SNF, protein, lactose, acidity, ash, total bacterial count, analysis of adulteration of milk (sugar, carbohydrate, urea, neutralizer, water), turbidity test for sterilized milk, preparation of sterilized flavoured milk, Cream preparation, preparation of butter from sour cream, salt analysis in butter, overrun in butter, yield of butter, preparation of ghee from cream/ butter, FFA value of ghee, preparation of ice-cream, overrun of ice cream (by weight/by volume), preparation of cheddar/gouda/mozzarella cheese, moisture of milk powder, bulk/true density of milk powder, solubility of milk powder, preparation of prebiotic yoghurt/ dahi, compositional analysis of traditional dairy products, manufacturing of sodium caseinate/calcium caseinate.

**Mapping of course “Lab-VII (Milk and Milk Products Quality)- MTFT-612-18” outcomes and Program outcomes:**

<b>Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)</b>							
	<b>Program Outcome (PO)</b>						
		<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>Course Outcome (CO)</b>	<b>CO 1</b>	1	2	2	3	2	3
	<b>CO 2</b>	2	2	2	3	2	2
	<b>CO 3</b>	1	2	1	3	2	2
	<b>CO 4</b>	2	2	2	3	2	2

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**MTFT-618-18: Dissertation-I**

L	T	P
0	0	10

The student is required to prepare his/her Presentation I, Presentation II and Report as per notification no. IKGPTU/Reg/NF/157 dated 04/04/2019 and should make a presentation to the DRC and external expert at the end of third semester.

**IK Gujral Punjab Technical University  
M. Tech of Food Technology (Batch 2018)**

# **ELECTIVE-II**

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**MTFT-615-18: FOOD RHEOLOGY AND TEXTURE**

Total Marks: 100

L	T	P
4	0	0

**Objective:**

1. To understand the concepts of food rheology and food texture
2. To depict rheological properties of foods and measuring methods.

**Course Outcome:** After the completion of the course, the students will be able to:

1. Comprehend various rheological and textural properties of solid and liquid foods.
2. Apprehend different models and tests related to food rheology.
3. Grasp knowledge regarding various instruments used in determination of food rheology.

**Course Content:**

**UNIT-I**

Food rheology concept, scope of food rheology, texture of foods – type of stress, types of strain, types of viscosity, modulus (young, shear, bulk), poisson's ratio, definition and importance of texture, texture-related concepts.

**UNIT-II**

Determination of rheological properties and measuring methods: destructive and non-destructive measurements, creep recovery and stress relaxation, dynamic mechanical tests, Modeling food texture: introduction, factor affecting texture, models to predict texture.

**UNIT-III**

Rheological properties of fluid food: viscosity, factors affecting viscosity, flow of material- Newton's law of viscosity, viscous fluids (Newtonian fluids, non-Newtonian fluids), plastic fluids (Bingham plastic, non-Bingham plastic fluids), fluid behavior in steady- shear flow: time dependent and time independent material function, viscosity measurement- capillary flow viscometers, orifice type viscometers, falling ball viscometers, rotational viscometers- concentric cylinder (coaxial rotational) viscometers, cone and plate viscometers, parallel plate viscometers, single-spindle viscometers (brookfield viscometer).

**UNIT-IV**

Rheological properties of solid food: deformation of material, viscoelastic behavior, Failure and glass transition in solid foods: failure in solid foods, glass transition of solids foods (measurement, factors affecting, importance), Texture of foods: compression, snapping-bending, cutting shear, puncture, penetration, texture profile analysis, dough testing instruments- farinograph and mixograph, extensograph and alveograph, amylograph.

**Recommended readings:**

1. Rao, M. A., Rizvi, S. S. H. and Datta A. K. 2005. *Engineering Properties of Foods*: CRC Press.
2. Heldman, D. R. (2007). *Food Process Engineering*: AVI Publications.
3. Faridi, H. and Faubion, J. M. (1997). *Dough Rheology and Baked Products*: CBS Publications, New Delhi.

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

4. Rao, M. A. (2007). *Rheology of Fluid and Semisolid Foods: Principles and Applications* (2 ed.): Springer, USA.

**Mapping of course “Food Rheology and Texture- MTFT-615-18” outcomes and Program outcomes:**

Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)							
	Program Outcome (PO)						
		PO1	PO2	PO3	PO4	PO5	PO6
Course Outcome (CO)	CO 1	3	1	2	3	1	2
	CO 2	3	1	2	2	1	2
	CO 3	2	2	1	2	1	2

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**MTFT-616-18: BIOPROCESS ENGINEERING**

Total Marks: 100

L	T	P
4	0	0

**Objective:**

1. To acquaint the students with recent concepts of Bioprocess Engineering.
2. To illustrate the functioning of various devices involved in formation and recovery of bio-processed products.

**Course Outcome:** After the completion of the course, the students will be able to:

1. Aware of the status of bio-processing in food industry.
2. Comprehend the fermentation technology involving design and processing.
3. Perceive knowledge regarding instrumentation involved in production of bio-processed products.
4. Apprehend about the recovery of bio-processed products.

**Course Content:**

**UNIT-I**

Introduction to bioprocessing, historical developments, bioenergetics, enzyme kinetics- Micaelismenton model, effect of temperature on reaction rate, microbial growth kinetics- batch culture, continuous culture, fed batch culture and application of fed batch culture, Sterilization and sanitation: thermal death kinetics, medium sterilization (batch and continuous design), sterilization of fermenter, feed and wastes; filter sterilization of media, air and exhaust air; theory of depth filters, isolation, preservation (storage on reduced temp, storage under liquid nitrogen, storage on agar slopes, storage in dehydrated form) and improvement of industrially important micro-organisms.

**UNIT-II**

Fermenter design- basic functions of fermenters, types of fermenter, construction material, pipes and tubes, valves and steam traps, agitator and impeller, stirrer and bearing (seals and drives), sparger, baffles, achievement and maintenance of aseptic conditions (sterilization of air, exhaust gas and fermenter), sampling port, controlling devices.

**UNIT-III**

Product recovery- foam separation, precipitation, filtration (batch, continuous, cross flow filtration), filter aids, filtration equipment, filtration theory, centrifugation, centrifuge equipment, centrifugation theory, liquid- liquid extraction- solvent recovery, two phase aqueous extraction, supercritical fluid extraction, chromatography, (adsorption chromatography, gel permeation, ion exchange chromatography, HPLC, RPC, continuous chromatography), membrane processes (ultrafilteraiton, reverse osmosis, liquid membranes), drying, crystallization, whole broth processing.

**UNIT-IV**

Bioprocess instrumentation- Offline analytical methods, physical, chemical and biosensors, online sensors.

**Recommended readings:**

1. Doran, P. M. (1995). *Bioprocess Engineering Principles*: Academic press, New Delhi.
2. Shuler, M. L. (2002). *Bioprocess Engineering Basic Concepts* (2 ed.): PHI, New Delhi.

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

3. Sablani, S. S., Rahman, M. S., Datta, A. K. and Mujumdar, A. S. (2007). *Handbook of Food and Bioprocess Modeling Techniques*: CRC Publications, New York.

**Mapping of course “Bioprocess Engineering- MTFT-616-18” outcomes and Program outcomes:**

<b>Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)</b>							
	<b>Program Outcome (PO)</b>						
		<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>Course Outcome (CO)</b>	<b>CO 1</b>	2	2	2	2	2	1
	<b>CO 2</b>	2	2	1	3	1	2
	<b>CO 3</b>	2	2	2	2	1	2
	<b>CO 4</b>	1	2	2	3	1	2



**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**MTFT-617-18: ADVANCED MEAT, FISH, POULTRY AND EGG TECHNOLOGY**

Total Marks: 100

L	T	P
4	0	0

**Objective:**

1. To understand the importance of livestock, egg and poultry industry.
2. To describe structure, composition and nutritional quality of animal products.
3. To comprehend the various post-mortem changes related to muscle and various other tissues.
4. To illustrate the processing technology of meat, poultry, fish and eggs.
5. To explain value addition and packaging of meat, fish and poultry products.

**Course Outcome:** After the completion of the course, the students will be able to:

1. Understand the technology for raw material characteristics, handling, processing, and preservation.
2. Grasp by-product utilization of meat, poultry, fish and egg products.
3. Apprehend the hygiene, sanitation and mechanized practices of meat, fish, poultry and egg industry.
4. Comprehend the food standards in relation to these food commodities.
5. Perceive the knowledge regarding transportation and storage practices.
6. Prepare various value added products.

**Course Content:**

**UNIT-I**

Production, Processing and consumption trends, Prospects of meat industry, Meat spoilage, Endogenous and exogenous infections, Hygiene and sanitation, Meat composition from different sources, Post-mortem muscle chemistry and composition, Intramuscular fat, Rigor mortis, The conversion of muscle into meat: Animals' stunning methods, ante-mortem and post-mortem examination, Design of handling facilities: Slaughtering and dressing, Consequences of circulatory failure, Proteolytic and other chemical changes, Operational factors affecting meat quality, Effects of processing on meat tenderization, Chilling, freezing and preservation, prepared meat products, intermediate moisture and dried meat products, The eating quality of meat: color, flavors and retention, water holding capacity, juiciness, texture and taste, meat eating and health, Inedible by-products.

**UNIT-II**

Quality characteristics of poultry products, Lay-out and design of poultry processing plants, Plant sanitation, Poultry meat processing operations and equipment for de-feathering, bleeding, scalding etc., Poultry meat products, Refrigerated storage of poultry meat, by-products

**UNIT-III**

Egg structure, structural abnormalities, functions of egg in food system, egg products, whole egg powder, egg yolk products, by-products, their packaging and storage, eating quality of eggs, Inspection and grading, preservation and safe handling.

**UNIT-IV**

Commercially important marine products from India, Product export and its sustenance, Processing operations, Basic biochemistry, Preservation of postharvest fish freshness, Transportation in refrigerated vehicles, Deodorization of transport systems, Design of refrigerated and insulated trucks,

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

Grading and preservation of shell fish, pickling and preparation of fish protein concentrate, fish oil and other by-products

**Recommended Readings:**

1. Lawrie, R. A. (1998). *Lawrie's Meat Science* (6 ed.): Woodhead Publications, Cambridge.
2. Alan, H. V. and Jane, P. S. (1995). *Meat and Meat Products: Technology, Chemistry and Microbiology*: Champan& Hill, London.
3. Carmen, R. O. and George, J. M. (1997). *Poultry Meat and Egg Production*: CBS Publications, New Delhi.
4. Winton, A. L. and Barberwinton, K. (1999). *Fish and Fish Products*: Agrobios, Bikaner.
5. Winton, A. L. and Winton, K. B. (1993). *The Structure and Composition of Animal Product*: Agro Botanical, Bikaner.

**Mapping of course “Advanced Meat, Fish, Poultry and Egg Technology- MTFT-617-18”outcomes and Program outcomes:**

<b>Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)</b>							
	<b>Program Outcome (PO)</b>						
		<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>Course Outcome (CO)</b>	<b>CO 1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>
	<b>CO 2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>
	<b>CO 3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
	<b>CO 4</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2</b>
	<b>CO 5</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>
	<b>CO 6</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>2</b>

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M. Tech of Food Technology (Batch 2018)**

# **SEMESTER FOURTH**

**IK Gujral Punjab Technical University**  
**M. Tech of Food Technology (Batch 2018)**

**MTFT-621-18: Dissertation-II**

L	T	P
0	0	32

A student is required to undertake a Dissertation II of 16 credits on a topic approved by the supervisor, the Departmental Research Committee (DRC) and external expert. The Dissertation II shall be evaluated at the end of the Semester IV as per notification no. IKGPTU/Reg/NF/157 dated 04/04/2019.