PUNJAB BOARD OF TECHNICAL EDUCATION

21-A, Kashmir Block Allama Iqbal Town, Lahore

www.pbte.edu.pk R&D Section Tel # 042-99260273

SAY NO TO CORRUPTION

No PBTE/R&D/2024/624 Dated:- 26-08-25

NOTIFICATION

In pursuance of NAVTTC Notification No. DG(SS&C)/DAE/2024 dated 25-07-2025, it is notified that the following old courses of DAE (3 years) have been repealed and replaced with revised courses in respective fields of technology as detailed below:

i- Diploma of Associate Engineer in Mechanical Technology (Power) with specialization in Auto & Farm Machinery (3 Years).
ii- Diploma of Associate Engineer in Architecture Technology (3 Years).
iii- Diploma of Associate Engineer in Food Processing and Preservation Technology (3 Years).
iv- Diploma of Associate Engineer in Electronics Technology (3 Years).
v- Diploma of Associate Engineer in Telecommunication Technology (3 Years).

The implementation of said revised technologies shall be effective on the students who shall be registered from academic session 2025-26 and onward. Punjab Board of Technical Education, Lahore shall conduct the examinations of the said revised technologies w.e.f. 1st Annual Examination 2026 and onwards accordingly. However, the candidates enrolled in the previous versions of the aforesaid DAE technologies will avail the prescribed chances under the old curricula. Soft copy of the revised curricula of the aforesaid technologies may be downloaded from the website of PBTE i.e. www.pbte.edu.pk/textbooks.html

SECRETARY

CC To

1- PA to Chairperson, PBTE, Lahore.
2- PA to DG Academics, TEVTA, Lahore.
3- PA to DG Operations, TEVTA, Lahore.
4- PA to Secretary, PBTE, Lahore.
5- PA to Controller of Examinations, PBTE, Lahore.
6- The Principals concerned.
7- Deputy Controller of Examinations (Conduct), PBTE, Lahore.
8- Deputy Controller of Examinations (Secrecy), PBTE, Lahore.
9- System Analyst, PBTE Lahore.
10- Assistant Controller of Examinations (Technical), PBTE, Lahore.
11- Assistant Controller of Examinations (Secrecy), PBTE, Lahore.
12- Assistant Controller of Examinations (P&P-I), PBTE, Lahore.
13- Assistant Controller of Examinations (P&P- II), PBTE, Lahore.
14- Web Administrator, PBTE Lahore to upload on Board Website.
15- In-Charge P&S Section, PBTE, Lahore.
16- In-Charge Operation Wing, PBTE Lahore.

0DAE FOOD PROCESSING AND PRESERVATION TECHNOLOGY

SCHEME OF STUDIES (Revised Feb. 2025)

Code		Title	T	P	C
Gen	111	Islamiat/Pakistan Studies	1	0	1
TTQ / Civic	111	Tarjuma-tul-Quran/ Civics	1	0	1
Eng	112	English	2	0	2
Comp	152	Computer Applications	1	3	2
Ch	123	Applied Chemistry	2	3	3
Phy	122	Applied Physics	1	3	2
Math	123	Applied Mathematics-I(PaperA+B)	3	0	3
MTF	111	Engineering Drawing	0	3	1
MTF	121	Workshop Practice	0	3	1
FPPT	1**0**3	Introduction to Food Science	2	3	3
FPPT	1**2**3	Fundamentals of Food Processing & Preservation	2	3	3
		Total	**15**	**21**	**22**

Second Year

Code		Title	T	P	C
Gen	2**0**1	Islamiat /Pakistan Studies	**1**	**0**	**1**
TTQ / Civic	211	Tarjuma-tul-Quran/ Civics	1	0	1
Math	233	Applied Mathematics-II (PaperA+B)	**3**	**0**	**3**
Mgm	231	Food Business Management	**1**	**0**	**1**
FPPT	2**0**3	Fruits and Vegetables Processing	**2**	**3**	**3**
FPPT	2**4**3	Cereals & Baking Technology	**2**	**3**	**3**
FPPT	2**5**3	Dairy Processing	**2**	**3**	**3**
FPPT	2**63**	Confectionery and Snack Foods	**2**	**3**	**3**
FPPT	2**72**	Food Microbiology	**1**	**3**	**2**
FPPT	28**2**	Food Chemistry & Analysis	**1**	**3**	**2**
FPPT	2**93**	Beverages Processing	**2**	**3**	**3**
		Total	**18**	**21**	**25**

Code		Title	T	P	C
Gen	301	Islamiat/Ethics and Pakistan Studies	1	0	1
Mgm	321	Business Communication	1	0	1
Mgm	301	Digital marketing	1	0	1
FPPT	**313**	Meat Poultry and seafood processing	2	3	3
FPPT	**322**	Oil and Fat Processing	1	3	2
FPPT	**342**	Food Packaging	1	3	2
FPPT	**351**	Food Safety & Quality Management	1	0	1
FPPT	**361**	Food Waste Management	1	0	1
FPPT	**371**	Food Laws & Regulations	1	0	1
FPPT	**302**	Food Process Engineering	1	3	2
FPPTM	**382**	Hospitality Management	1	3	2
FPPTPJ	**392**	Special Project	0	6	2
		Total	**12**	**21**	**19**

1st Year

اسلامیات/مطالعہ پاکستان

		ٹی	پی	سی
حصہ اول اسلامیات	GEN III			
حصہ دوم مطالعہ پاکستان		1	0	1
موضوعات حصہ اول اسلامیات	سال اول	کل وقت: 20 گھنٹے		

کتاب و سنت

(ا) قرآن مجید

-1 تعارف قرآن مجید 2- نزول قرآن 3- مکی و مدنی سورتوں کی خصوصیات 4- وحی کی اقسام 5- پندرہ منتخب آیات مع ترجمہ

1.1 تنالوا البر حتی تنفقوا مما تحبون

1.2 واعتصموا بحبل اللّٰہ جمیعا" ولا تفرقو

1.3 ولا یجرمنکم شنان قوم علی ان لا تعدلوا

1.4 ان اللّٰہ یامرکم ان تودوا الامانات الی اھلھا

1.5 ان اللّٰہ یامر بالعدل والاحسان

1.6 ان الصلوتہ تنھی عن الفحشاء والمنکر

1.7 لقد کان لکم فی رسول اللّٰہ سوۃ حسنتہ

1.8 ان اکرمکم عند اللّٰہ اتقاکم

1.9 وما آتاکم الرسول فخرزوو مانھی عنھوا انتھوا

1.10 ولوفو بالعھد

1.11 وماشروھن بالمعروف

1.12 یمحق اللّٰہ الربوویر بی الصمدقات

1.13 واصبر علی ما اصابک

1.14 وقولو قولا سدیدا

1.15 ان الدین عند اللّٰہ السلام

(ب) سنت

-1 سنت کی اہمیت

-2 دس منتخب احادیث مع ترجمہ و تشریح

1- انما الاعمال بالنیات

2- انما بعثت لاتمم مکارم الاخلاق

3- لا یومن احدکم حتی یحب لاخیہ ما یحب لنفسہ

4- المسلم من سلم المسلمون من لسانہ ویدہ

5- قل امنت باللہ ثم استقم

6- خیرکم خیرکم لاھلہ

7- سباب المسلم فسوق وقتالہ کفر

8- المومن اخو المومن

9- کل المسلم علی المسلم حرام دمہ وعرضہ ومالہ

10- ایتہ المنافق ثلاث اذا حدث کذب واذا وعد اخلف واذا اوتمن خان

دین اسلام

2.1 اسلام کے بنیادی مقاصد کی وضاحت اور انسان کی انفرادی و اجتماعی زندگی پر ان کے اثرات

1- توحید

2- رسالت

3- آخرت

4- ملائکہ

5- آسمانی کتب

2.2 عبادات

1- نماز 2- روزہ 3- حج 4- زکوٰۃ

مندرجہ بالا عبادات کی اہمیت و فضیلت، حکمتیں اور انسان کی انفرادی و معاشرتی زندگی پر اس کے اثرات

حصہ اول

حصہ اسلامیات

تدریسی مقاصد

۱۔ قرآن مجید

عمومی مقصد: طالب علم یہ سمجھنے کے قابل ہو کہ اسلام کی تعلیمات کا اصل سرچشمہ قرآن مجید ہے

خصوصی مقصد: طالب علم اس قابل ہو جائے گا کہ

☆ قرآن مجید کی تعریف کر سکے گا

☆ قرآن مجید کے نزول کی صورت بیان کر سکے

☆ قرآن مجید کی مکی و مدنی سورتوں کی پہچان کر سکے

☆ منتخب آیات کا ترجمہ و تشریح کر سکے

عمومی مقصد: یہ سمجھنے کے قابل ہو جائے گا کہ منتخب قرآنی آیات کے ذریعے اسلامی تعلیمات کا مفہوم کیا ہے

☆ قرآنی آیات کا ترجمہ تشریح کر سکے

☆ قرآنی تعلیمات کی روشنی میں اپنی اور معاشرتی اصلاح کر سکے

2۔ سنت

عمومی مقصد: طالب علم سنت نبوی کی اہمیت اور ضرورت کو اچھی طرح سمجھنے کے قابل ہو جائے گا

خصوصی مقصد:

☆ سنت کی تعریف بیان کر سکے

☆ سنت کی اہمیت و ضرورت کی وضاحت کر سکے

☆ سنت کی روشنی میں اسوہ حسنہ پر عمل کر سکے

3۔ منتخب احادیث نبویہ

عمومی مقصد: احادیث کی روشنی میں اخلاقی اقدار سے آگاہی حاصل کر سکے

خصوصی مقصد: احادیث کا ترجمہ و تشریح کر سکے

رسول اللہ ﷺ کے اسوۂ حسنہ کی پیروی کا جذبہ پیدا ہو سکے

دین اسلام

عمومی مقاصد: دین اسلام کے بنیادی مقاصد اور عبادات کے بارے میں جان سکے اور بیان کر سکے

خصوصی مقاصد

لفظ دین اسلام کے لغوی اور اصطلاحی معنی بیان کر سکے

اسلام کے بنیادی مقاصد کی اہمیت بیان کر سکے

اسلام کے بنیادی مقاصد سے انسان کی انفرادی و اجتماعی زندگی پر پڑنے والے اثرات بیان کر سکے

عبادت کے لغظی و اصطلاحی معنی بیان کر سکے

عقیدے اور عبادت کا فرق بیان کر سکے

عبادات (نماز، روزہ، حج، زکواۃ) کے فوری اخلاقی اور انسانی زندگی پر ان کی اثرات بیان کر سکے

اسلامی مقاصد و عبادات کے مطابق اپنی زندگی ڈھال کر ایک اچھا مسلمان بن سکے

(غیر مسلم طلباء کے لئے)

نصاب اخلاقیات سال اول	GEN III	ٹی	ٹی	سی
حصہ دوم مطالعہ پاکستان		1	0	1

موضوعات

کل وقت - 20 گھنٹے

اخلاقیات کی تعریف اور اہمیت

اخلاقیات کا معیار (قانون، عقل، الہی کتب)

مندرجہ ذیل اخلاق کی وضاحت

- ☆ دیانت داری
- ☆ وفاداری
- ☆ نظم و ضبط
- ☆ راست گوئی
- ☆ صبر و استقلال
- ☆ حوصلہ مندی
- ☆ وقت کی پابندی
- ☆ صفائی
- ☆ ایثار
- ☆ باہمی احترام
- ☆ مصلحت

تدریسی مقاصد

عمومی مقاصد: اعلیٰ اخلاق کی وجہ سے ملکی ترقی میں مثل قدر اضافہ کر سکے

خصوصی مقاصد: طالب اس علم سے اس قابل ہو گا کہ

- ☆ موضوعات کا مطلب بیان کر سکے
- ☆ عملی زندگی سے مثالوں کی نشاندہی کر سکے
- ☆ اپنی شخصیت اور معاشرے پر موضوعات کے مثبت اثرات پیدا کرنے کے طریقے بیان کر سکے
- ☆ دیانت داری کی اہمیت بیان کر سکے
- ☆ وفاداری کی اہمیت بیان کر سکے
- ☆ نظم و ضبط کی افادیت بیان کر سکے
- ☆ صدق بیان کی ضرورت بیان کر سکے
- ☆ حوصلہ مندی کے فوائد بیان کر سکے
- ☆ وقت کی پابندی کے فوائد بیان کر سکے
- ☆ صفائی اور باہمی اختیار سے حسن کارکردگی کو بیان کر سکے
- ☆ مصلحت کے فوائد بیان کر سکے

نصاب (سال اول) (Gen III)

حصہ دوئم　　مطالعہ پاکستان　　کل وقت 12 گھنٹے

موضوعات

☆ حریت فکر : مسلمان قوم میں آزادی فکر کی تاریخ - مسلمانوں میں سیاسی آزادی کی اہمیت اور ضرورت - زوال، جمود اور غلامی کے تفصیلات

☆ نظریہ پاکستان

قیام پاکستان کی اساس (دین اسلام) قیام پاکستان کی غرض و غایت نظریہ پاکستان کی وضاحت - نظریہ پاکستان اور مسلم اقبال اور قائداعظم کے ارشادات کی روشنی میں

☆ نظریہ پاکستان کا تاریخی پس منظر

محمد بن قاسم کی آمد - مجدد الف ثانی اور شاہ ولی اللہ کی تبلیغی خدمات سید احمد شہید کی تحریک مجاہدین

☆ تعلیمی تحریکیں

علی گڑھ - ندوۃ العلماء (لکھنؤ) - مدرسۃ الاصلاح - (سندھ) اسلامیہ کالج (پشاور) انجمن حمایت اسلام (لاہور)

مطالعہ پاکستان (حصہ دوئم)

تدریسی مقاصد

حریت فکر:

عمومی مقصد

طالب علم یہ جان لے کہ اسلام میں اور مسلمان قوم میں آزادی فکر کی کیا اہمیت ہے

خصوصی مقاصد

☆ حریت فکر کا معنی و مفہوم بیان کر سکے

☆ آزادی فکر کی اہمیت بیان کر سکے

☆ خصوصاً اسلام میں آزادی اظہار رائے کی اہمیت بیان کر سکے

☆ ذہنی غلامی کے قومی سطح پر نقصانات کے بیان کر سکے

☆ جسمانی غلامی قومی سطح پر نقصانات بیان کر سکے

نظریہ پاکستان

عمومی مقصد:

نظریہ پاکستان (دین اسلام) سے پوری طرح واقفیت ہو جائے

خصوصی مقاصد:

☆ نظریہ کی تعریف بیان کر سکے اور اس کی وضاحت کر سکے

☆ نظریہ پاکستان کی تعریف کر سکے اور اس کا مفہوم بیان کر سکے

☆ علامہ اقبال اور قائداعظم کے فرمودات کی روشنی میں نظریہ پاکستان بیان کر سکے

نظریہ پاکستان کا تاریخی پہلو

عمومی مقصد

☆ نظریہ پاکستان کے تاریخی پس منظر سے واقفیت حاصل کر سکے

خصوصی مقاصد:

☆ محمد بن قاسم کے بارے میں بیان کر سکے

- محمد بن قاسم کے ہندوستان پر حملہ کی وجہ بیان کر سکے
- محمد بن قاسم کے ہندوستان پر حملہ کے اثرات بیان کر سکے
- بیان کر سکے کہ ہندوستان میں ہندو مسلم دو قومی نظریہ کا نکتہ آغاز کیا ہے
- مجدد الف ثانی کی علمی خدمات بیان کر سکے
- شاہ ولی اللہ کی علمی خدمات بیان کر سکے
- مجدد الف ثانی اور شاہ ولی اللہ نے جو تبلیغ دین اور مسلمانوں میں سیاسی شعور پیدا کیا اسے بیان کر سکے

علمی تحریکیں

عمومی مقصد

- برصغیر کی علمی تحریکوں سے آگاہی حاصل ہو سکے

خصوصی مقاصد:

- علی گڑھ - دیوبند - ندوۃ العلماء مدرسۃ السلام ، اسلامیہ کالج۔ انجمن حمایت اسلام نے تعلیم کے ذریعہ سیاسی شعور مسلمانوں میں پیدا کیا اسے بیان کر سکے
- آزادی ہند کے سلسلہ میں تحریک مجاہدین کی خدمات بیان کر سکے

****

TTQ-111 / Civic-111;

Tarjumat-ul-Quran / Civics

T	P	C
1	0	1

Total Contact Hours:

Theory: **32**

Practical: **0**

Note: Syllabi for these subject would be as per BISEs / General education, developed by Punjab Curriculum TextBook Board (PCTB)

Eng-112 ENGLISH

Total contact hours

Theory	64	T	P	C
Practical	0	2	0	2

AIMS At the end of the course, the students will be equipped with cognitive skill to enable them to present facts in a systematic and logical manner to meet the language demands of dynamic field of commerce and industry for functional day-to-day use and will inculcate skills of reading, writing and comprehension.

COURSE CONTENTS

ENGLISH PAPER "A"

1 PROSE/TEXT 16 hours

1.1 First eight essays of Intermediate English Book-II

2 CLOZE TEST 4 hours

2.1 A passage comprising 50-100 words will be selected from the text. Every 11th word or any word for that matter will be omitted. The number of missing word will range between 5-10. The chosen word may or may not be the one used in the text, but it should be an appropriate word.

ENGLISH PAPER "B"

3 GRAMMAR 26 hours

3.1 Sentence Structure.
3.2 Tenses.
3.3 Parts of speech.
3.4 Punctuation.
3.5 Change of Narration.
3.6 One word for several
3.7 Words often confused

4. COMPOSITION 8 hours

4.1 Letters/Messages
4.2 Job application letter
4.3 For character certificate/for grant of scholarship
4.4 Telegrams, Cablegrams and Radiograms, Telexes, Facsimiles
4.5 Essay writing
4.6 Technical Education, Science and Our life, Computers, Environmental Pollution, Duties of a Student.

5. TRANSLATION 10 hours

5.1 Translation from Urdu into English.
For Foreign Students: A paragraph or a dialogue.

REFERENCE BOOKS

- Technical English developed by Mr. Zia Sarwar, Mr. Habib-ur –Rehman, Evaluated by Mr.Zafar Iqbal Khokhar, Mr. Zahid Zahoor, Vol - I, National Book Foundation

Eng-112 ENGLISH

INSTRUCTIONAL OBJECTIVES

PAPER-A

1. DEMONSTRATE BETTER READING, COMPREHENSION AND VOCABULARY

1.1 Manipulate, skimming and scanning of the text.
1.2 Identify new ideas.
1.3 Reproduce facts, characters in own words
1.4 Write summary of stories

2. UNDERSTAND FACTS OF THE TEXT

2.1 Rewrite words to fill in the blanks recalling the text.
2.2 Use own words to fill in the blanks.

PAPER-B

3. APPLY THE RULES OF GRAMMAR IN WRITING AND SPEAKING

3.1 Use rules of grammar to construct meaningful sentences containing a subject and a predicate.
3.2 State classification of time, i.e. present, past and future and use verb tense correctly in different forms to denote relevant time.
3.3 Identify function words and content words.
3.4 Use marks of punctuation to make sense clear.
3.5 Relate what a person says in direct and indirect forms.
3.6 Compose his writings.
3.7 Distinguish between confusing words.

4. APPLY THE CONCEPTS OF COMPOSITION WRITING TO PRACTICAL SITUATIONS

4.1 Use concept to construct applications for employment, for character certificate, for grant of scholarship.
4.2 Define and write telegrams, cablegrams and radiograms, telexes, facsimiles
4.3 Describe steps of a good composition writing.
4.4 Describe features of a good composition.
4.5 Describe methods of composition writing
4.6 Use these concepts to organize facts and describe them systematically in practical situation.

5. APPLY RULES OF TRANSLATION

5.1 Describe confusion.
5.2 Describe rules of translation.
5.3 Use rules of translation from Urdu to English in simple paragraph and sentences.

Math-123 APPLIED MATHEMATICS-I

T	P	C
3	0	3

Pre-requisite: Must have completed a course of Elective Mathematics at Matric level.

AIMS: After completing the course the students will be able to

- Solve problems of Algebra, Trigonometry, vectors, Mensuration, Matrices and Determinants.
- Develop skill, mathematical attitudes and logical perception in the use of mathematical instruments as required in the technological fields.
- Acquire mathematical clarity and insight in the solution of technical problems.

COURSE CONTENTS

1. QUADRATIC EQUATIONS **6 Hours**

1.1 Standard Form
1.2 Solution
1.3 Nature of roots
1.4 Sum & Product of roots
1.5 Formation
1.6 Problems

2. BINOMIAL THEOREM **6 Hours**

2.1 Factorials
2.2 Binomial Expression
2.3 Binomial Co-efficient
2.4 Statement
2.5 The General Term
2.6 The Binomial Series
2.7 Problems.

3. PARTIAL FRACTIONS **6 Hours**

3.1 Introduction
3.2 Linear Distinct Factors Case I
3.3 Linear Repeated Factors Case II
3.4 Quadratic Distinct Factors Case III
3.5 Quadratic Repeated Factors Case IV
3.6 Problems

4. FUNDAMENTALS OF TRIGONOMETRY **6 Hours**

4.1 Angles
4.2 Quadrants
4.3 Measurements of Angles
4.4 Relation between Sexagesimal & circular system
4.5 Relation between Length of a Circular Arc & the Radian Measure of its central Angle
4.6 Problems

5. TRIGONOMETRIC FUNCTIONS AND RATIOS **6 Hours**

5.1 Trigonometric functions of any angle
5.2 Signs of trigonometric Functions
5.3 Trigonometric Ratios of particular Angles
5.4 Fundamental Identities
5.5 Problems

6. GENERAL IDENTITIES **6 Hours**

6.1 The Fundamental Law
6.2 Deductions
6.3 Sum & Difference Formulae
6.4 Double Angle Identities
6.5 Half Angle Identities
6.6 Conversion of sum or difference to products
6.7 Problems

7. SOLUTION OF TRIANGLES **(42) 6 Hours**

7.1 The law of Sines
7.2 The law of Cosines
7.3 Measurement of Heights & Distances
7.4 Problems

8. VECTORS AND PHASORS **12 Hours**

8.1 Scalars and Vectors
8.2 The unit Vectors i, j, k
8.3 Direction Cosines
8.4 Dot Product
8.5 Cross Product
8.6 Analytic Expressions for dot and cross products
8.7 Phasors
8.8 Significance of j Operator
8.9 Different Forms
8.10 Algebraic Operations
8.11 Problems

9. COMPLEX NUMBERS **9 Hours**

9.1 Introduction and Properties
9.2 Basic Operations
9.3 Conjugate
9.4 Modulus
9.5 Different Forms
9.6 Problems

10. BOOLEAN ALGEBRA AND GATE NETWORKS **15 Hours**

10.1 Concept and basic laws
10.2 Sums of product and products of sums
10.3 Binary, decimals and octals, presentation of decimal numbers in BCD
10.4 Intercoversion of numbers
10.5 OR Gates and AND Gates
10.6 Logical Expressions and their simplifications
10.7 Demorgan's Theorams
10.8 NAND Gates and NOR Gates
10.9 Problems

11. PLANE ANALYTIC GEOMETRY AND STRAIGHT LINE **6 Hours**

11.1 Coordinate system
11.2 Distance formula
11.3 Ration Formulas
11.4 Inclination and slope of line

11.5 Slope Formula
11.6 Problems

12. EQUATIONS OF THE STRAIGHT LINE **6 Hours**

12.1 Some Important Forms
12.2 General form
12.3 Angle Formula
12.4 Parallelism and Perpendicularity
12.5 Problems

13. EQUATIONS OF THE CIRCLE **6 Hours**

13.1 Standard and Central forms of equations
13.2 General Form of Equation
13.3 Radius and Coordinates of Center
13.4 Problems

REFERENCE BOOKS

- Applied Mathematics Math-123, by Nasir -ud-Din Mahmood, Sana-ullah Khan, Tahir Hameed, Syed Tanvir Haider, Javed Iqbal, Vol - I, National Book Foundation

INSTRUCTIONAL OBJECTIVES

1. USE DIFFERENT METHODS FOR THE SOLUTION OF QUADRATIC EQUATION

1.1 Define a standard quadratic equation.
1.2 Use methods of factorization and method of completing the square for solving the equations.
1.3 Derive quadratic formula.
1.4 Write expression for the discriminant.
1.5 Explain nature of the roots of a quadratic equation.
1.6 Calculate the sum and product of the roots.
1.7 Form a quadratic equation from the given roots.
1.8 Solve problems involving quadratic equations.

2. APPLY BINOMIAL THEOREM FOR THE EXPANSION OF BINOMIAL AND EXTRACTION OF ROOTS.

2.1 State binomial theorem for positive integral index.
2.2 Explain binomial coefficients:
(n,0), (n,1).....(n,r)....., (n,n)
2.3 Derive expression for the general term.
2.4 Calculate the specified terms.
2.5 Expand a binomial of a given index.
2.6 Extract the specified roots.
2.7 Compute the approximate value to a given decimal place.
2.8 Solve problems involving binomials.

3. APPLY DIFFERENT METHODS FOR RESOLVING A SINGLE FRACTION INTO PARTIAL FRACTIONS USING DIFFERENT METHODS

3.1 Define a partial fraction, a proper and an improper fraction.
3.2 Explain all the four types of partial fractions.
3.3 Set up equivalent partial fractions for each type.
3.4 Explain the methods for finding constants involved.
3.5 Resolve a single fraction into partial fractions.
3.6 Solve problems involving all the four types.

4. UNDERSTAND THE SYSTEMS OF MEASUREMENT OF ANGLES.

4.1 Define angles and the related terms.
4.2 Illustrate the generation of an angle.
4.3 Explain sexagesimal and circular systems for the measurement of angles.
4.4 Derive the relationship between radian and degree.
4.5 Convert radians to degrees and vice versa.
4.6 Derive a formula for the circular measure of a central angle.
4.7 Use this formula for solving problems.

5. UNDERSTAND BASIC CONCEPTS AND PRINCIPLES OF TRIGONOMETRIC FUNCTIONS.

5.1 Define the basic trigonometric functions/ratios of an angle as ratios of the sides of a right triangle.
5.2 Derive fundamental identities.
5.3 Find trigonometric ratios of particular angles.
5.4 Draw the graph of trigonometric functions.
5.5 Solve problems involving trigonometric functions.

6. USE TRIGONOMETRIC IDENTITIES IN SOLVING TECHNOLOGICAL PROBLEMS.

6.1 List fundamental identities.

6.2 Prove the fundamental law.
6.3 Deduce important results.
6.4 Derive sum and difference formulas.
6.5 Establish half angle, double and triple angle formulas.
6.6 Convert sum or difference into product and vice versa.
6.7 Solve problems.

7. USE CONCEPT, PROPERTIES AND LAWS OF TRIGONOMETRIC FUNCTIONS FOR SOLVING TRIANGLES.

7.1 Define angle of elevation and angle of depression.
7.2 Prove the law of sines and the law of cosines.
7.3 Explain elements of a triangle.
7.4 Solve triangles and the problems involving heights and distances.

8. UNDERSTAND PRINCIPLES OF VECTORS AND PHASORS

8.1 Define unit vectors i, j, k.
8.2 Express a vector in the component form.
8.3 Explain magnitude, unit vector, direction cosines of a vector.
8.4 Explain dot product and cross product of two vector.
8.5 Deduce important results from dot and cross product.
8.6 Define phasor and operator j.
8.7 Explain different forms of phasors.
8.8 Perform basic Algebraic operation on phasors.
8.9 Solve problems on phasors.

9. USE PRINCIPLES OF COMPLEX NUMBERS IN SOLVING TECHNOLOGICAL PROBLEMS.

9.1 Define a complex number and its conjugate.
9.2 State properties of complex numbers.
9.3 Give different forms of complex numbers.
9.4 Perform basic algebraic operations on complex numbers.
9.5 Solve problem involving complex numbers.

10. SOLVE TECHNICAL PROBLEMS USING PRINCIPLES OF BOOLEAN ALGEBRA

10.1 Explain fundamental concepts of Boolean algebra
10.2 Explain binary numbers, octal numbers, decimal numbers and their interconversion.
10.3 Explain digital addition and multiplication and its applications to OR gates and AND Gates
10.4 Illustrate complimentation and inversion
10.5 Evaluate logical expression
10.6 List basic Laws of Boolean Algebra
10.7 Explain De-Morgan's theorem
10.8 Explain basic duality of Boolean algebra
10.9 Derive Boolean expression
10.10 Explain combination of GATES
10.11 Illustrate sum of products and product of sum
10.12 Derive product of sum expression
10.13 Explain NAND Gates and NOR Gates
10.14 Use the map methods for simplifying expressions
10.15 Explain sub-cubes and covering

11. UNDERSTAND THE CONCEPT OF PLANE ANALYTIC GEOMETRY

11.1 Explain the rectangular coordinate system.
11.2 Locate points in different quadrants.
11.3 Derive distance formula.
11.4 Describe the ratio formula

11.5 Derive slope formula
11.6 Solve problems using the above formulae.

12. USE EQUATIONS OF STRAIGHT LINE IN SOLVING PROBLEMS.

12.1 Define equation of a straight line.
12.2 Derive slope intercept and intercept forms of equations of a straight line.
12.3 Write general form of equations of a straight line.
12.4 Derive an expression for angle between two straight lines.
12.5 Derive conditions of perpendicularity and parallelism of two straight lines.
12.6 Solve problems using these equations/formulae.

13. SOLVE TECHNOLOGICAL PROBLEMS USING EQUATIONS OF CIRCLE

13.1 Define a circle.
13.2 Describe standard, central and general forms of the equation of a circle.
13.3 Convert general form to the central form of equation of a circle.
13.4 Deduce formula for radius and coordinates of the center of a circle.
13.5 Derive equation of the circle passing through three points.
13.6 Solve problems involving these equations.

MTF111 ENGINEERING DRAWING

Total Contact Hours

Theory	0	T	P	C
Practical	96	0	3	1

AIM:To acquaint the students with the basic knowledge and practice in engineering drawing necessary for a food technologist to communicate meaning fully with equipment and plant designer

LIST OF PRACTICALS

1. Introduction and importance of the course
2. Lettering and practice from A-Z in capitals slants
3. Lettering and practice from A-Z in capital verticals
4. Lettering and practice from A-Z in small cases vertical
5. Lettering and practice from A-Z in small cases slants
6. Practice in lettering and figures
7. Familiarization with drawing instruments
8. Use of drawing instruments in simple part drawing
9. Practice in alphabet of lines
10. Drawing of a simple part to show the use of engineering lines
11. Simple geometry construction of acute, obtuse, straight, reflex and right angles
12. Geometrical figure i.e. polygons, circles, in scribed and circumscribed
13. Types and construction of ellipses in various modes i.e. simple, tangent, and parallelogram methods
14. Introduction to geometrical solids ,cubes, prisms, pyramids and cones
15. Conic sections circle, ellipse, parabola, hyperbola
16. Construction of parabola by basic and tangent methods
17. Introduction to dimensioning
18. Practice in dimensioning in a simple part drawing
19. Projection and projector
20. Introduction to3-dimensionalfigures,i.e.block,V-block,cylinder
21. Introduction to picture plan
22. Introduction to dihedral angle-placement of object in first and third angle
23. Orthographic projections with the help of drawing of a simple object-glass box method
24. Practice in drawing an object
25. Drawing of a slotted block
26. Drawing of a gland f or astuffing box
27. Introduction to pictorial drawing
28. Pictorial block
29. Isometric oblique and perspective projections
30. Isometric scale and isometric drawings of aV-block
31. Pictorial and orthographic drawings of differentmachineparts
32. Terminology and types of threads
33. Drawing of a square threads in gleand double start
34. Drawing of a square and hexagonal nut and bolt

RECOMMENDED BOOKS

1. A.C. Parkinson ,First Year Engineering Drawing
2. Luzadar, Fundamentals of Engineering Drawing

MTF121 WORKSHOP PRACTICE

Total Contac hours

		T	P	C
Theory	0			
Practical	96	0	3	1

AIM: To equip the students with the basic knowledge of workshop practice necessary for smooth running of food machinery and equipment.

LIST OF PRACTICALS

Metal Work-Shop Orientation:-

1. Laying out and measuring tools
2. Use of measuring instrument sand gauges
3. Use of micrometer
4. Use of vernier caliper
5. Metal sawing practice
6. Use of chisels,
7. Chipping straight groves in steel
8. Metal filling practice
9. Pipe threading practice
10. Drilling holes with hand, portable electrician delectric drill press
11. Uses of screw pitch gauge for checking number of threads on nuts and bolts
12. Making studbolts and nuts
13. Practice on riveting
14. Practice of grinding drill bits
15. Practice on sheetmetal
16. Making of paper weight ,hammer, and square piece according to size, legs of inside caliper

Welding-Shop Orientation:-

1. Familiarization and use of gas welding plant
2. Familiarization and operation of arc welding plant
3. Soldering and brazing materials

Machine Shop-Shop Orientation

1. Practiceof usingmeasuringscalesin

2. Practiceoffixing job,cuttingtoolsonlatheandtakingsimplecuts
3. Grindingpracticeoflathetools
4. Grindingpracticeofdrills
5. Practiceofsimpleandstepturning
6. Practiceofknurling
7. Practiceofdrilling reamingonlathe
8. Simpleboringpractice
9. Taperturningpracticebytheuseoftoolspostandtailstock
10. PracticeofcuttingsimplescrewthreadsonlathePracticeofcutting internalthreads
11. Practiceof rapidandplainindexing
12. Indexingpracticeinspurgearcutting

RECOMMENDEDBOOKS

1. Luding,MetalWork
2 R.E.Smith,ForgingandWeldingPartI,
3. H.D.Burghardt,MachineToolOperationPartI,

COMP-152 **COMPUTER APPLICATIONS**

Total Contact Hours		**T**	**P**	**C**
Theory:	**32 Hrs**	**1**	**3**	**2**
Practical:	**96 Hrs**			

Pre-requisites: None

AIMS: This subject will enable the student to be familiar with the fundamental concepts of Computer Science. He will also learn MS-Windows, MS-Office, and Internet to elementary level.

Course Contents:

1. ELECTRONIC DATA PROCESSING (E.D.P.) 6 Hrs

1.1 Basic Terms of Computer Science Data & its, types, Information, Hardware, Software
1.2 Computer & its types
1.3 Generations of Computers
1.4 Block diagram of a computer system
1.5 BIT, Byte, RAM & ROM
1.6 Input &Output devices
1.7 Secondary storage devices
1.8 Types of Software
1.9 Programming Languages
1.10 Applications of computer in different fields
1.11 Application in Engineering, Education & Business

2. MS-WINDOWS 10 2 Hrs

2.1 Introduction to Windows
2.2 How to install Drivers in Windows
2.3 Loading & Shut down process
2.4 Introduction to Desktop items (Creation of Icons, Shortcut, Folder & modify Taskbar)
2.5 Desktop properties
2.6 Use of Control Panel
2.7 Searching a document

3. MS-OFFICE (MS-WORD -2016) 8 Hrs

3.1 Introduction to MS-Office
3.2 Introduction to MS-Word & its Screen
3.3 Create a new document
3.4 Editing & formatting the text
3.5 Saving & Opening a document
3.6 Page setup (Set the Margins & Paper)
3.7 Spell Check & Grammar
3.8 Paragraph Alignment
3.9 Inserting Page numbers, Symbols, Text box & Picture in the document
3.10 Use the different Format menu drop down commands (Drop Cap, Change Case, Bullet & Numbering and Border & Shading)
3.11 Insert the Table and it's Editing
3.12 Printing the document
3.13 Saving a document file as PDF format

4. MS-OFFICE (MS-EXCEL -2016) 9 Hrs

4.1 Introduction to MS-Excel & its Screen
4.2 Entering data & apply formulas in worksheet
4.3 Editing & Formatting the Cells, Row & Colum
4.4 Insert Graphs in sheet
4.5 Page setup, Print Preview & Printing
4.6 Types & Categories of Charts

5. MS. OFFICE (MS-POWER POINT- 2016) 4 Hrs.

5.1 Introduction to MS-Power point
5.2 Creating a, presentation
5.3 Editing & formatting a text box
5.4 Adding pictures & colors to a slide
5.5 Making slide shows
5.6 Slide Transition

6. INTERNET & E-MAIL 3Hrs

6.1 Introduction to Internet & browser window
6.2 Searching, Saving and Print a page from internet
6.3 Creating, Reading & Sending E-Mail
6.4 Drop Box / Online/ Sky drive/ Cloud data etc.
6.5 File attachment.
6.6 Uploading and downloading file(s) and software(s)
6.7 Explain some advance features over the internet and search engines
6.8 Difference between Internet, Intranet and Extranet

Recommended Textbooks:

1. Bible Microsoft Office 2016 by John Walkenbach
2. Bible Microsoft Excel 2016 by John Walkenbach
3. Bible Microsoft PowerPoint 2016 by John Walkenbach

COMP-152 **COMPUTER APPLICATIONS**

Instructional Objectives:

1. UNDERSTAND ELECTRONIC DATA PROCESSING (E.D.P)

1.1. Describe Basic Terms of Computer Science. Data & its Types, Information, Hardware, Software
1.2. Explain Computer & its types
1.3. Generations of Computers
1.4. Explain Block diagram of a computer system
1.5. State the terms such as BIT, Byte, RAM & ROM
1.6. Identify Input & Output devices
1.7. Describe Secondary Storage devices
1.8. Explain Types of Software
1.9. Introduction to Programming Language
1.10. Explain Applications of computer in different fields
1.11. Application in Engineering, Education & Business

2. UNDERSTAND MS-WINDOWS 10

2.1 Explain Introduction to Windows
2.2 How to install Drivers in Windows
2.3 Describe Loading & Shut down process
2.4 Explain Introduction to Desktop items (Creation of Icons, Shortcut, Folder & modify Taskbar)
2.5 Explain Desktop properties
2.6 Describe use of Control Panel (add/remove program, time & date, mouse and create user account)
2.7 Explain the method of searching a document

3. UNDERSTAND MS-OFFICE (MS-WORD – 2016)

3.1 Explain Introduction to MS-Office
3.2 Describe -Introduction to MS-Word & its Screen
3.3 Describe create a new document
3.4 Explain Editing & formatting the text
3.5 Describe saving & Opening a document
3.6 Explain Page setup, (Set the Margins & Paper)
3.7 Describe Spell Check & Grammar
3.8 Explain Paragraph Alignment
3.9 Explain Inserting Page numbers, Symbols, Text box & Picture in the document
3.10 Describe Use the different Format menu drop down commands (Drop Cap, Change Case, Bullet &Numbering and Border & Shading)
3.11 Explain Insert the Table and its Editing and modifying
3.12 Describe printing the document
3.13 Describe the method of file saving as a PDF Format

4. UNDERSTAND MS-OFFICE (MS-EXCEL- 2016)

4.1 Explain Introduction to MS-Excel & its Screen
4.2 Describe Entering data & apply formulas in worksheet
4.3 Describe Editing &Formatting the, Cells, Row & Column
4.4 Explain Insert Graphs in sheet
4.5 Describe Page setup, Print preview & Printing
4.6 Explain in details formulas for sum, subtract, multiply, divide, average

4.7 Explain in details the types of charts e.g pie chart, bar chart

5. UNDERSTAND MS-OFFICE (MS-POWER POINT-2016)

5.1 Describe Introduction to MS-Power point
5.2 Explain creating a presentation
5.3 Describe Editing & formatting a text box
5.4 Explain Adding pictures & colors to a slide
5.5 Describe Making slide shows
5.6 Explain Slide Transitions

6. UNDERSTAND INTERNET &E-MAIL

6.1 Explain Introduction to Internet and browser window
6.2 Explain Searching, Saving and Print a page from internet
6.3 Describe Creating, Reading & Sending E-Mail
6.4 Interpret Drop Box / Online/ Sky drive/ Cloud data etc.
6.5 File attachment.
6.6 Uploading and downloading file(s) and software(s)
6.7 Explain some advance features over the internet and how to search topics on different search engines
6.8 Enlist the Difference between Internet, Intranet and Extranet

COMP-152 **COMPUTER APPLICATIONS**

List of Practical:

1. **Identify key board, mouse, CPU, disk drives, disks, monitor, and printer** and **3Hrs**
2. **MS WINDOWS 10** **12 Hrs**
   - 2.1 Practice of loading and shutdown of operating system
   - 2.2 How to install Drivers in Windows
   - 2.3 Creating items (icons, shortcut, folders etc) and modifying taskbar
   - 2.4 Changing of wallpaper, screensaver, and resolution
   - 2.5 Practice of control panel items (add/remove, time and date, mouse, and create user account)
3. **MS OFFICE (MS-WORD 2016)** **27 Hrs**
   - 3.1 Identifying the MS Word Screen and its menu
   - 3.2 Practice of create a new document, saving and re-opening it from the location and spell check & grammar
   - 3.3 Practice of Page Formatting (Borders, Character Spacing, Paragraph, Bullets & Numberings and Fonts)
   - 3.4 Practice of different tool bars like standard, format& drawing tool bars
   - 3.5 Practice of Insert pictures, clipart, and shapes
   - 3.6 Practice of header and footer
   - 3.7 Practice of insert table and also format of table
   - 3.8 Practice of page setup, set the page margins, and printing documents
4. **MS OFFICE (MS-EXCEL 2016)** **27 Hrs**
   - 4.1 Identifying the MS EXCEL Screen and its menu
   - 4.2 Practice of create a new sheet, saving and re-opening it from the location and spell check
   - 4.3 Practice of insert and delete of row and columns (format of cell)
   - 4.4 Practice of entering data and formulas in worksheet (Add, Subtract, Multiplying, and Divide & Average)
   - 4.5 Repeating practical serial number04
   - 4.6 Practice of insert chart and its types
   - 4.7 Practice of page setup, set the page margins, and printing
5. **MS OFFICE (MS-POWER POINT 2016)** **15 Hrs**
   - 5.1 Identifying the MS POWER POINT Screen and its menu
   - 5.2 Practice of create a new presentation and save
   - 5.3 Practice of open saves presentations
   - 5.4 Practice of inset picture and videos
6. **INTERNET & E-MAIL** **12 Hrs**
   - 6.1 Identifying internet explorer
   - 6.2 Practice of searching data from any search engine
   - 6.3 Practice of create an E-Mail account and how to send and receive mails, download attachments
   - 6.4 File attachment.
   - 6.5 Uploading and downloading file(s) and software(s)

Phy-122 APPLIED PHYSICS

Total Contact Hours

			T	P	C
Theory	**:**	**32**			
Practicals	**:**	**96**	**1**	**3**	**2**

AIMS: The students will be able to understand the fundamental principles and concept of physics, use these to solve problems in practical situations/technological courses and understand concepts to learn advance physics/technical courses.

COURSE CONTENTS

1 MEASUREMENTS. 2 Hours

- 1.1 Fundamental units and derived units
- 1.2 Systems of measurement and S.I. units
- 1.3 Concept of dimensions, dimensional formula
- 1.4 Conversion from one system to another
- 1.5 Significant figures

2 SCALARS AND VECTORS. 4 Hours

- 2.1 Revision of head to tail rule
- 2.2 Laws of parallelogram, triangle and polygon of forces
- 2.3 Resolution of a vector
- 2.4 Addition of vectors by rectangular components
- 2.5 Multiplication of two vectors, dot product and cross product

3 MOTION 4 Hours

- 3.1 Review of laws and equations of motion
- 3.2 Law of conservation of momentum
- 3.3 Angular motion
- 3.4 Relation between linear and angular motion
- 3.5 Centripetal acceleration and force
- 3.6 Equations of angular motion

4 TORQUE, EQUILIBRIUM AND ROTATIONAL INERTIA. 6 Hours

- 4.1 Torque
- 4.2 Centre of gravity and centre of mass
- 4.3 Equilibrium and its conditions
- 4.4 Torque and angular acceleration
- 4.5 Rotational inertia

5 WAVE MOTION. 5 Hours

- 5.1 Review Hooke's law of elasticity
- 5.2 Motion under an elastic restoring force
- 5.3 Characteristics of simple harmonic motion
- 5.4 S.H.M. and circular motion
- 5.5 Simple pendulum
- 5.6 Wave form of S.H.M.
- 5.7 Resonance
- 5.8 Transverse vibration of a stretched string

6 SOUND. 5 Hours

- 6.1 Longitudinal waves
- 6.2 Intensity, loudness, pitch and quality of sound
- 6.3 Units of Intensity of level and frequency response of ear
- 6.4 Interference of sound waves silence zones, beats
- 6.5 Acoustics
- 6.6 Doppler effect.

7 LIGHT. 5 Hours

- 7.1 Review laws of reflection and refraction
- 7.2 Image formation by mirrors and lenses
- 7.3 Optical instruments
- 7.4 Wave theory of light
- 7.5 Interference, diffraction, polarization of light waves
- 7.6 Applications of polarization in sunglasses, optical activity and stress analysis

8 OPTICAL FIBER. 2 Hours

- 8.1 Optical communication and problems
- 8.2 Review total internal reflection and critical angle
- 8.3 Structure of optical fiber
- 8.4 Fiber material and manufacture
- 8.5 Optical fiber - uses.

9 LASERS. 3 Hours

- 9.1 Corpuscular theory of light
- 9.2 Emission and absorption of light
- 9.3 Stimulated absorption and emission of light
- 9.4 Laser principle
- 9.5 Structure and working of lasers
- 9.6 Types of lasers with brief description.
- 9.7 Applications (basic concepts)
- 9.8 Material processing
- 9.9 Laser welding
- 9.10 Laser assisted machining
- 9.11 Micro machining
- 9.12 Drilling, scribing and marking
- 9.13 Printing
- 9.14 Lasers in medicine

RECOMMENDED BOOKS

1. Text Book of Phy-122, Vol-I, developed by Curriculum Section, Academics wing TEVTA and published by National Book Foundation (NBF)

Phy-122 APPLIED PHYSICS

INSTRUCTIONAL OBJECTIVES

1 USE CONCEPTS OF MEASUREMENT TO PRACTICAL SITUATIONS AND TECHNOLOGICAL PROBLEMS.

- 1.1 Write dimensional formulae for physical quantities
- 1.2 Derive units using dimensional equations
- 1.3 Convert a measurement from one system to another
- 1.4 Use concepts of measurement and Significant figures in problem solving.

2 USE CONCEPTS OF SCALARS AND VECTORS IN SOLVING PROBLEMS INVOLVING THESE CONCEPTS.

- 2.1 Explain laws of parallelogram, triangle and polygon of forces
- 2.2 Describe method of resolution of a vector into components
- 2.3 Describe method of addition of vectors by rectangular components
- 2.4 Differentiate between dot product and cross product of vectors
- 2.5 Use the concepts in solving problems involving addition resolution and multiplication of vectors.

3 USE THE LAW OF CONSERVATION OF MOMENTUM AND CONCEPTS OF ANGULAR MOTION TO PRACTICAL SITUATIONS.

- 3.1 Use law of conservation of momentum to practical/technological problems.
- 3.2 Explain relation between linear and angular motion
- 3.3 Use concepts and equations of angular motion to solve relevant technological problems.

4 USE CONCEPTS OF TORQUE, EQUILIBRIUM AND ROTATIONAL INERTIA TO PRACTICAL SITUATION/PROBLEMS.

- 4.1 Explain Torque
- 4.2 Distinguish between Centre of gravity and centre of mass
- 4.3 Explain rotational Equilibrium and its conditions
- 4.4 Explain Rotational Inertia giving examples
- 4.5 Use the above concepts in solving technological problems.

5 USE CONCEPTS OF WAVE MOTION IN SOLVING RELEVANT PROBLEMS.

- 5.1 Explain Hooke's Law of Elasticity
- 5.2 Derive formula for Motion under an elastic restoring force
- 5.3 Derive formulae for simple harmonic motion and simple pendulum
- 5.4 Explain wave form with reference to S.H.M. and circular motion
- 5.5 Explain Resonance
- 5.6 Explain Transverse vibration of a stretched string
- 5.7 Use the above concepts and formulae of S.H.M. to solve relevant problems.

6 UNDERSTAND CONCEPTS OF SOUND.

- 6.1 Describe longitudinal wave and its propagation
- 6.2 Explain the concepts: Intensity, loudness, pitch and quality of sound
- 6.3 Explain units of Intensity of level and frequency response of ear
- 6.4 Explain phenomena of silence zones, beats
- 6.5 Explain Acoustics of buildings
- 6.6 Explain Doppler effect giving mathematical expressions.

7 USE THE CONCEPTS OF GEOMETRICAL OPTICS TO MIRRORS and LENSES.

7.1 Explain laws of reflection and refraction
7.2 Use mirror formula to solve problems
7.3 Use the concepts of image formation by mirrors and lenses to describe working of optical instruments, e.g. microscopes, telescopes, camera and sextant.

8 UNDERSTAND WAVE THEORY OF LIGHT

8.1 Explain wave theory of light
8.2 Explain phenomena of interference, diffraction, polarization of light waves
8.3 Describe uses of polarization given in the course contents.

9 UNDERSTAND THE STRUCTURE, WORKING AND USES OF OPTICAL FIBER.

9.1 Explain the structure of the Optical Fiber
9.2 Explain its principle of working
9.3 Describe use of optical fiber in industry and medicine.

Phy-122 APPLIED PHYSICS

LIST OF PRACTICALS.

1 Draw graphs representing the functions:
   a) $y=mx$ for $m=0, 0.5, 1, 2$
   b) $y=x^2$
   c) $y=1/x$
2 Find the volume of a given solid cylinder using Vernier callipers.
3 Find the area of cross-section of the given wire using micrometer screw gauge.
4 Prove that force is directly proportional to (a) mass, (b) acceleration, using fletchers' trolley.
5 Verify law of parallelogram of forces using Grave-sands apparatus.
6 Verify law of triangle of forces and Lami's theorem
7 Determine the weight of a given body using
   a) Law of parallelogram of forces
   b) Law of triangle of forces
   c) Lami's theorem
8 Verify law of polygon of forces using Grave-sands apparatus.
9 Locate the position and magnitude of resultant of like parallel forces.
10 Determine the resultant of two unlike parallel forces.
11 Find the weight of a given body using principle of moments.
12 Locate the center of gravity of regular and irregular shaped bodies.
13 Find Young's Modules of Elasticity of a metallic wire.
14 Verify Hooke's Law using helical spring.
15 Study of frequency of stretched string with length.
16 Study of variation of frequency of stretched string with tension.
17 Study resonance of air column in resonance tube and find velocity of sound.
18 Find the frequency of the given tuning fork using resonance tube.
19 Find velocity of sound in rod by Kundt's tube.
20 Verify rectilinear propagation of light and study shadow formation.
21 Study effect of rotation of plane mirror on reflection.
22 Compare the refractive indices of given glass slabs.
23 Find focal length of concave mirror by locating centre of curvature.
24 Find focal length of concave mirror by object and image method
25 Find focal length of concave mirror with converging lens.
26 Find refractive index of glass by apparent depth.

27 Find refractive index of glass by spectrometer.

28 Find focal length of converging lens by plane mirror.

29 Find focal length of converging lens by displacement method.

30 Find focal length of diverging lense using converging lens.

31 Find focal length of diverging lens using concave mirror.

32 Find angular magnification of an astronomical telescope.

33 Find angular magnification of a simple microscope (magnifying glass)

34 Find angular magnification of a compound microscope.

35 Study working and structure of camera.

36 Study working and structure of sextant.

37 Compare the different scales of temperature and verify the conversion formula.

38 Determine the specific heat of lead shots.

39 Find the coefficient of linear expansion of a metallic rod.

40 Find the heat of fusion of ice.

41 Find the heat of vaporization.

42 Determine relative humidity using hygrometer.

Ch-123 APPLIED CHEMISTRY

Total Contact Hours

		T	P	C
Theory	64			
Practical	96	2	3	3

AIM After studying this course the students will be able to:

a. Understand the significance and role of chemistry in the development of modern technology.
b. Know the basic principles of chemistry as applied in the study of this technology.
c. Understand the scientific methods for production, properties and use of materials of industrial and technological significance.
d. Gain skill for efficient conduct of practical in a chemistry lab.

COURSE CONTENTS

1. INTRODUCTION 3hours

Scope and significance.

Orientation with reference to this technology.

Terms used & units of measurements in the study of chemistry.

2 FUNDAMENTAL CONCEPTS OF CHEMISTRY 3hours

Symbols, valence, radicals, formulas. Chemical reactions & their types.

3 ATOMIC STRUCTURE. 4hours

Sub-atomic particles.

Architecture of atoms of elements, Atomic No. and Atomic Weight. Periodic classification of elements and periodic law.

4. CHEMICAL BOND 3hours

Nature of chemical bond.

Electrovalent bond with examples.

Covalent bond (polar and non-polar) sigma and Pi bonds with examples.

Co-ordinate bond with examples.

5. GASES AND LIQUIDS 4hours

Liquid and gaseous state.

Liquids and their general properties (density, viscosity, surface tension capillary action etc.).

Gases and their general properties. Gas laws (Boyle' slaw, Charles's law, and Graham law of diffusion etc.). Problems involving gas laws.

6. WATER. 4hours

Chemical nature and properties.
Impurities.
Hardness of water (types, causes and removal).
Scales of measuring hardness (degrees Clark, French, ppm, mg per liter).
Boiler feed water, scales and treatment.
Sea-water desalination, sewage treatment. Sterilization
of water.

7. ACIDS, BASES AND SALTS. 3hours

Definitions with examples.
Properties, their strength, basicity and Acidity, Salts and their classification with examples.
PH-value and scale.

8. OXIDATION AND REDUCTION. 3hours

The process, definition and scope with examples. Oxidizing and Reducing agents.
Oxides and their classifications.

9. NUCLEAR CHEMISTRY. 3hours

Introduction and Radio activity (alpha, beta and gamma rays) Half-life process.
Nuclear reaction and transformation of elements.
Radiations and Food preservation.

10. CORROSION. 3hours

Introduction with causes.
Types of corrosion.
Rusting of iron Protective measures against corrosion.

11. FOOD PRESERVATIVES 3hours

Nature of food preservatives.
Some important food preservatives.
Classification of preservatives.
Uses of preservatives.

12. ALLOYS. 3hours

Introduction with need.
Preparation and properties.
Some important alloy sand their composition. Uses.

13. CHEMICAL ASPECTS OF FOOD. 4hours

Introduction.
Essential food ingredients
Carbohydrates
Proteins Fats.

14. PLASTICS AND POLYMERS. 3hours

Introduction.
Polymerization and its mechanism.
Synthetic fibers.
Uses of polymers.

15. DYES AND COLOURS. 3hours

General Introduction.
Chemical nature of dye-stuffs. Classification of dyes and their uses.
Coloring agents for food.

16. POLLUTION. 3hours

The problems and its dangers. Causes of environmental pollution.
Common pollutants.
Remedies to combat the hazards of pollution.

17. INTRODUCTIONTOORGANICCHEMISTRY. 3hours

Introduction and significance.
Classification of organic compounds.
Nomenclature of organic compounds.

18. CARBOHYDRATES. 3hours

Introduction.
Classification.
Properties and uses.

19. PROTEINS. 3hours

Introduction.
Chemical nature and sources. Properties
and uses.

20. FATS and OILS. 3hours

Introduction.
Chemical nature.
Sources and properties.
Importance as food.

Ch-123 APPLIED CHEMISTRY

INSTRUCTIONAL OBJECTIVES

1. UNDERSTAND THE SCOPE, SIGNIFICANCE AND ROLE OF THE SUBJECT.

Define chemistry and its terms.

Define units of measurements in the study of chemistry. Explain the importance of chemistry in various fields of specialization. Illustrate the role of chemistry in this technology.

2. UNDERSTAND LANGUAGE OF CHEMISTRY AND CHEMICAL REACTIONS.

Define symbol, valence, radical, formula with examples of each. Write chemical formula of common compounds.

Define chemical reaction and equations.

Describe types of chemical reactions with examples.

List chemical formula of common substances used in the respective subject.

3. UNDERSTANDTHESTRUCTUREOFATOMSANDARRANGEMENTOFSUB ATOMICPARTICLESINTHEARCHITECTUREOFATOMS.

Define atom.

Describe the fundamental sub atomic particles

Distinguish between atomic No., mass No. and between isotope and isobars.

Explain the arrangements of electrons in different shells and sub energy levels.

Explain the grouping and placing of elements in the periodic table.

State the periodic law of elements.

Describe the trend properties of elements based on their position in the periodic table.

Describe general characteristics of a period and a group.

4. UNDERSTAND THE NATURE OF CHEMICAL BOUNDS.

Define chemical Bond.

Describe the nature of chemical bond. Differentiate between electrovalent and covalent bonding.

Explain the formation of polar and nonpolar sigma and pi-bond with examples.

Explain the nature of coordinate bond with examples.

5. UNDERSTAND THE STATES OF MATTER AND APPLY GAS LAWS TO SOLVE ALLIED PROBLEMS.

Describe the liquid and gaseous states of matter. Describe the general properties of liquid.

Describe the general properties of gases.

State Boyle's law, Charles’s law, Graham's law of diffusion, Dalton's law of partial pressure.

State the mathematical forms of these laws Derive gas

equation.

Solve problems on gas laws and gas equations.

6. UNDERSTAND CHEMICAL NATURE OF WATER.

Describe the chemical nature of water with its formula. Describe the general impurities present in water.

Explain the causes and methods to remove hardness of water.

Express hardness in different units like mg/per liter, p.p.m, degrees clark and degrees French.

Describe the formation and nature of scales in boiler feed water.

Explain the method for the treatment of scales.

Explain the sewage treatment and desalination of sea water.

Describe methods of sterilization of water.

7. UNDERSTAND THE NATURE OF ACIDS, BASES AND SALTS.

Define acids, bases and salts with examples.

Describe general properties of acids and bases.

Define and differentiate between acidity and basicity and use the terms.

Define salts and give their classification with examples.

Explain pH value of solution and pH scale.

8. UNDERSTAND THE PROCESS OF OXIDATION AND REDUCTION.

Define oxidation.

Explain the oxidation process with examples.

Define reduction.

Explain reduction process with examples.

Define oxidizing and reducing agents and give atleast six examples of each.

Define oxides.

Classify the oxides with examples.

9. UNDERSTAND THE FUNDAMENTALS OF NUCLEAR CHEMISTRY.

Define nuclear chemistry and radioactivity.

Differentiate between alpha, beta and gamma particles.

Explain half-life process.

Explain atleast six nuclear reactions resulting in the transformation of some elements.

Give six important uses of isotopes.

Explain the use of radiations in food preservation.

10. UNDERSTAND THE PROCESS OF CORROSION WITH ITS CAUSES AND TYPES.

Define corrosion. Describe different types of corrosion. State the causes of corrosion.

Explain the process of rusting of iron. Describe methods to prevent / control corrosion.

11. UNDERSTAND THE CHEMICAL NATURE AND USE OF IMPORTANT PRESERVATIVES USED IN FOOD INDUSTRY.

Define a preservative.

List some important preservatives with their chemical formula.

Explains general uses of preservatives.

Classify food preservatives.

Explain action and specific use of some preservative agents.

12. UNDERSTAND THE NATURE OF ALLOYS OF ALLOYS USED IN RESPECTIVE TECHNOLOGY

Define alloy.

Explain methods for the preparation of alloys.

Describe important properties of alloys.

Explain common properties and uses of alloys

13. UNDERSTAND THE NATURE OF FOOD.

Define food.

Describe food ingredients like carbohydrates, proteins and fats.

Explain importance, properties and uses of food ingredients.

14. UNDERSTAND THE NATURE OF PLASTICS AND POLYMERS.

Define plastics and polymers.

Explain the mechanism of polymerization.

Explain the preparation and uses of synthetic fiber.

List some important synthetic fibers used in textile industry.

15. UNDERSTAND THE CHEMICAL NATURE OF DYES AND COLOURS.

Define dyes and colors.

Describe chemical nature of the dye stuffs. Classify dyes and state their uses.

Enlist the coloring agents for food.

16. KNOW THE NATURE OF POLLUTION.

Define pollution (air, water, food).

Describe causes of environmental pollution. Enlist some common pollutants.

Describe methods to prevent pollution.

17. UNDERSTAND THE NATURE AND SIGNIFICANCE OF ORGANIC CHEMISTRY.

Define organic chemistry.

State the uses of organic chemistry in modern world.

Classify the organic compounds.

Explain functional group.

Name organic compounds on the basis of I.U.P.A.C. system

18. UNDERSTAND CARBO HYDRATES AS A CHEMICAL CLASS

Define carbohydrates and give examples. Explain their structure.

Classify carbohydrates.

State some important chemical and physical properties. Give uses of carbohydrates.

19. EXPLAIN THE CHEMICAL NATURE, IMPORTANCE AND USES OF PROTEINS.

Define protein and cite examples with sources.

Define amino acids and give examples.

Explain some important Chemical and Physical properties of proteins.

Explain uses as food ingredients.

20. EXPLAIN THE CHEMICAL NATURE AND USE OF FATS and OILS.

Define fat and oil with examples.

Describe chemical nature and sources of fats and oils.

Differentiate fats from oils.

Give some important physical and chemical properties of fats. Explain their use and significance as food.

Ch-123 APPLIED CHEMISTRY

LIST OF PRACTICALS

1. To introduce the common apparatus, glassware and chemical reagents used in the chemistry lab.
2. To purify a chemical substance by crystallization.
3. To separate a mixture of sand and salt.
4. To find the melting point of substance.
5. To find the pH of a solution with pH paper.
6. To separate a mixture of inks by chromatography.
7. To determine the co-efficient of viscosity of benzene with the help of Ostwald vasomotor.
8. To find the surface tension of a liquid with a stalagmometer.
9. To perform electrolysis of water to produce Hydrogen and Oxygen.
10. To determine the chemical equivalent of copper by electrolysis of CuSO.
11. To get introduction with the scheme of analysis of salts for basic radicals.
12. To analyse1st group radicals (Ag^{+}- Pb^{++}- Hg^{+}).
13. To make practice for detection1st group radicals.
14. To get introduction with the scheme of II group radicals.
15. To detect and confirm II-A radicals (hg^{++}, Pb^{++++}, Cu^{+}, Cd^{++},Bi^{+++}).
16. To detect and confirm II-B radicals Sn^{+++}, Sb^{+++}, As^{+++}).
17. To get introduction with the scheme of III group radicals (Fe^{+++}-Al^{+++},Cr^{+++})
18. To detect and confirm Fe^{+++}, $Al^{+++}$and Cr^{+++}.
19. To get introduction with the scheme of IV group radicals.
20. To detect and confirm $An^{++}$and Mn^{++}radicals of IV group.
21. To detect and conform $Co^{++}$and Ni^{++}radicals of IV group.
22. To get introduction with the Acid Radical Scheme.
23. To detect dilute acid group.
24. To detect and confirm CO''_3 and HCO'_3 radicals.
25. To get introduction with the methods / apparatus of conducting volumetric estimations.
26. To prepare standard solution of a substance.
27. To find the strength of a given alkali solution.
28. To estimate HCO'_3 contents in water.
29. To find out the % age composition of a mixture solution of KNO_3 and KOH volumetrically.
30. To find the amount of chloride ions (Cl') in water volumetrically.

RECOMMENDED BOOKS

1. Text Book of Intermediate Chemistry (Part I and II)
2. Sh. Atta Mohammad, Ilmi Applied Science.
3. J. N. Reddy, Polytechnic Chemistry, Tata Mc- Graw HillCo., New Delhi.
4. Qammar Iqbal, Chemistry for Engineers and Technologists.

(FPPT-103) INTRODUCTION TO FOOD SCIENCE

Total Contact Hours				
Theory	64	T	P	C
Practical	96	2	3	3

Learning Outcomes: The student will be able to understand basic principles of food science, including the chemical, biological, and physical properties of food. They will also be able to analyze the role of ingredients, processing techniques, and preservation methods. The outcomes of this course will enable the students to apply them in advanced courses for better understanding and insight

Course Contents

1. Introduction **10 hours**

1.1. Food Security
1.2. Food & Diet
1.3. Nutrition science
1.4. Food Science
1.5. Food Technology
1.6. Food Safety
1.7. Food Processing and Preservation
1.8. Food Sources (Plant, Animal, Marine)
1.9. Food Industry of Pakistan
1.10. Scope of Food Science

2. Significance of Food Science & Technology **06 hours**

2.1. Regulating food supply
2.2. Consumer convenience
2.3. Economic gains
2.4. Nutritional Quality
2.5. Sustainability

3. Food Components I **16 hours**

3.1. Water
3.2. Carbohydrates
3.3. Proteins
3.4. Lipids

4. Food Components II **12 hours**

4.1. Vitamins
4.2. Minerals
4.3. Other constituents (color, flavor, Toxicants)

5. Classification of Foods **06 hours**

5.1. Based on perishability
5.2. Based on pH scale

6. Food Spoilage **08 hours**

6.1. Contamination
6.2. Deterioration
6.3. Autolysis
6.4. Spoilage of perishable foods
6.5. Spoilage of semi-perishable foods
6.6. Spoilage of stable foods

7. Spoilage Agents **06 hours**

7.1. Enzymes
7.2. Micro organisms
7.3. Insects, rodents and birds
7.4. Physical Factors

Recommended books:

1. Awan, J.A. (2018). Introduction to food science and technology Unitech Communications
2. Potter, N. N., & Hotchkiss, J. H. (2012). *Food science*. Springer Science & Business Media.
3. Campbell-Platt, G. (Ed.). (2017). *Food science and technology*. John Wiley & Sons.
4. Ward, J., & Ward, R. (2019). Introduction to food science and food systems Cengage Learning.
5. Shewfelt, R. L. (2009). Introducing food science CRC Press.

(FPPT-103) INTRODUCTION TO FOOD SCIENCE

INSTRUCTIONAL OBJECTIVES

1. Introduction

1.1. Define Food Security
1.2. Differentiate Food & Diet
1.3. Define Food Science
1.4. What is Food Technology?
1.5. Define Food Safety
1.6. Enlist the source Food.
1.7. Enlist the different types Food Industry in Pakistan
1.8. Describe the scope of Food Science

2. Significance of Food Science & Technology

2.1. Explain the importance of Food Science &Technology

3. Food Components I

3.1. What is the importance of Water?
3.2. What are Carbohydrates?
3.3. What are the different sources of Proteins?
3.4. What are Lipids?

4. Food Components II

4.1. What are micro and macro nutrients?
4.2. What are water soluble Vitamins?
4.3. What are micro and macro Minerals?
4.4. What are toxicants?
4.5. Give importance of food colors

5. Classification of Foods

5.1. Describe the classification of food based on perishability
5.2. Describe the classification based on pH scale
5.3. Define perishable foods
5.4. Define acidic foods

6. Food Spoilage

6.1. What is Contamination?
6.2. Give difference between Deterioration & Spoilage

6.3. Define Autolysis
6.4. Describe the Spoilage of perishable foods
6.5. Describe Spoilage of semi-perishable foods

7. Spoilage Agents

7.1. Enlist different spoilage agents
7.2. What are Enzymes?
7.3. What are Micro organisms
7.4. Name Physical Factors that cause food spoilage

(FPPT-103) INTRODUCTION TO FOOD SCIENCE

List of Practical **96 Hrs.**

1. Implement Lab Safety rules
2. Identify lab equipment & Glassware
3. Prepare solutions (percent, molar, normal, molal)
4. Determine pH of selected foods
5. Determine moisture of food samples
6. Determine acidity of juices
7. Determine turbidity of water
8. Determine fat Percentage of food sample
9. Determine Ash of selected food samples
10. Determine brix of juice, ketchup & Syrups
11. Determine TDS of drinking Water
12. Visit of food industries

(FPPT-123) FUNDAMENTALS OF FOOD PROCESSING & PRESERVATION

Total Contact Hours:

	T	P	C
Theory: 64			
Practical: 96	2	3	3

Learning Outcomes: The student will be able to understand the principles and scientific basis of food processing and preservation techniques to maintain food quality, safety, and nutritional value. On the completion of this course they will be able to apply knowledge of traditional and modern preservation methods in developing sustainable and innovative food processing solutions.

Course Contents

1. **Introduction** **04 hours**
   - **1.1** Food preservation
   - **1.2** Food processing
   - **1.3** Need of food processing & preservations
   - **1.4** Traditional & modern Food preservations techniques

2. **Principles of Food Preservation** **06 hours**
   - **2.1.** Prevention or delay of autolysis
   - **2.2.** Prevention or delay of microbial activity
   - **2.3.** Control of pest activities.
   - **2.4.** Reduction in physical defects.

3. **Preservation by High Temperature** **08 hours**
   - **3.1.** Blanching
   - **3.2.** Pasteurization
   - **3.3.** Sterilization
   - **3.4.** Canning
   - **3.5.** Cooking

4. **Preservation by Low Temperature** **06 hours**
   - **4.1.** Cold Storage
   - **4.2.** Refrigeration
   - **4.3.** Frozen storage

5. **Preservation by Removal of Moisture** **08 hours**
   - **5.1.** Role & forms of water in food
   - **5.2.** Sun-drying
   - **5.3.** Dehydration
   - **5.4.** Evaporation and concentration
   - **5.5.** Freeze-drying
   - **5.6.** Dehydro-freezing

5.7. Advantages of dried foods

6. Preservation by Additives **06 hours**

6.1. Food Additives & Classification
6.2. Non-preservative food additives
6.3. Preservative food Additives

7. Preservation by Fermentation **06 hours**

7.1. Objectives of fermentations
7.2. Fermentation & Its types
7.3. Lactic Acid fermentation
7.4. Acetic acid fermentation
7.5. Alcoholic fermentation

8. Modern Food Preservation Techniques **06 hours**

8.1. HPP
8.2. Cold Plasma
8.3. PEF
8.4. Active packaging
8.5. Irradiations

9. Food Packaging **04 hours**

9.1. Packing, packaging
9.2. Packaging materials
9.3. Aseptic packaging

Recommended Books:

1. Awan J.A., 2011. Food Processing & Preservation. Unitech Communications, Faisalabad.
2. Awan J.A. and Rehman S.U., 2015. Food Preservation manual, Unitech Communications, Faisalabad.
3. Rahman, M. S. (Ed.). (2020). *Handbook of food preservation*. CRC press.
4. Singh, D., & Singh, D. (2024). *Fundamentals of food processing & preservation*. Shree Publishers & Distributors.
5. Naik, H. R., & Amin, T. (2022). Food processing and preservation. Routledge.

(FPPT-123) FUNDAMENTALS OF FOOD PROCESSING & PRESERVATION

INSTRUCTIONAL OBJECTIVES

1. Introduction

1.1 Define food processing & preservation
1.2 Differentiate between food preservation and food processing
1.3 Enlist Objectives of food processing & preservation
1.4 Describe need of food processing and preservations
1.5 Enlist traditional food preservations techniques
1.6 Enlist modern food preservations techniques

2. Principles of Food Preservation

2.1 Define autolysis
2.2 Describe types of autolysis
2.3 Describe methods of prevention or delay of autolysis
2.4 Define water activity
2.5 Enlist spoilage microorganisms
2.6 Describe different methods of controlling pest activities
2.7 Define physical defects and give examples of physical defects

3. Preservation by high temperature

5.1 Define blanching
5.2 Describe methods of blanching
5.3 Define pasteurization
5.4 Describe methods of pasteurization
5.5 Define sterilization
5.6 Describe methods of sterilization
5.7 Define canning
5.8 Describe unit operations of canning
5.9 Define cooking
5.10 Enlist methods of cooking foods

4. Preservation by low temperature

4.1 What is cold storage?
4.2 Describe procedure for cold storage
4.3 Describe factors affecting cold storage
4.4 Define refrigeration
4.5 Describe procedure for refrigeration
4.6 What is frozen storage?
4.7 Describe procedure for frozen storage

5. Preservation by Removal of Moisture

5.1 Describe role of water in foods.
5.2 Describe forms of water in food
5.3 Define Sun-drying

5.4 Define dehydration
5.5 Describe principle involved in dehydration
5.6 Describe different types of dehydrators
5.7 Differentiate between drying and dehydration
5.8 Define evaporation and concentration
5. 9 Describe method of evaporation and concentration
5.10 Define Freeze-drying
5.11 Define Dehydro-freezing.
5.12 Describe advantages of dried foods

6. Preservation by Additives

6.1 Define food Additives
6.2 Describe objectives of using food additives
6.3 Classify food additives into Non-preservative food additives and preservative food additives
6.4 Describe the uses of Non-preservative food additives
6.5 Describe the uses of preservative food additives

7. Preservation by Fermentation

7.1 Define fermentation and enlist its types
7.2 Describe the objectives of fermentation
7.3 Describe the lactic acid fermentation with examples
7.4 Describe the acetic acid fermentation with examples
7.5 Describe the alcoholic fermentation with examples

8. Modern food Preservation Techniques

8.1 Define high pressure processing (HPP)
8.2 Describe working principle of HPP
8.3 Define cold plasma
8.4 Describe applications of cold plasma technology in food preservation
8.5 Define Pulse Electric Field (PEF)
8.6 Define food irradiation
8.7 Describe commercial applications of food irradiation

9. Food Packaging

9.1 Differentiate between packing and packaging
9.2 Enlist the materials used for food packaging
9.3 Define aseptic packaging

(FPPT-123) FUNDAMENTALS OF FOOD PROCESSING & PRESERVATION

List of Practical 96 Hrs.

1. Identify Lab equipment.

2. Perform pasteurization of milk.

3. Perform pasteurization efficiency test (phosphatase test)

4. Perform canning of seasonal fruits

5. Perform cold storage of seasonal fruits and vegetables.

6. Perform freezing of seasonal fruits and vegetables.

7. Perform thawing of frozen foods

8. Prepare yogurt from milk

9. Prepare pan bread by alcoholic fermentation.

10. Prepare mixed pickle.

11. Perform sun-drying of seasonal fruits and vegetables.

12. Perform dehydration of seasonal fruits and vegetables.

13. Prepare fruit squash

14. Prepare mayonnaise

15. Industrial visit of relevant industries

اسلامیات/مطالعہ پاکستان

نصاب سال دوئم

حصہ اول اسلامیات

حصہ دوئم مطالعہ پاکستان

ٹی	پی	سی
1	0	1

کل وقت 20 گھنٹے:

موضوعات:

1۔ سورۃ المومنون ایک تا گیارہ آیات کا ترجمہ مع تشریح

2۔ دس منتخب احادیث مع ترجمہ وتشریح

() خیر کم من تعلم القرآن و علمه

() لا ایمان لمن لا امانته له ولا دین لا من لا اعهد له

() و یاکم والظن ان الظن اکرب الحدیث

() من احدث فی امرنا هذا ما لیس منه فهورد

() من حمل علینا السلاح فلیس منا

() انا و کافل الیتیم فی الجنه

() لا ضرور ولا ضرار فی السلام

() کلکم راع و کلکم راع و کلکم مسول عن رعیته

3۔ سیرۃ طیبہ

() مکی زندگی۔ولادت۔بعثت۔ہجرت

() مدنی زندگی۔مواخات۔میثاق مدینہ۔فتح مکہ(اسباب ونتائج)

4۔ حضورﷺ بحیثیت

() خطبہ حجۃ الوداع۔انسانی حقوق کا اعلامیہ/حقوق انسانی پالیسی 2018

() معلم کامل۔سربراہ خاندان

5۔ اسلامی معاشرہ

نظام تعلیم اوراس کے مقاصد۔عدل وانصاف۔امر بالمعروف۔نہی عن المنکر۔انسانی حقوق کا معاشرتی اور معاشی ترقی میں کردار

جہاد۔کسب حلال۔مسجد(اہمیت وفضیلت)

6۔ اسلامی ریاست کی تعریف۔اسلامی ریاست کی خصوصیات۔اسلامی حکومت کے فرائض۔اسلامی طرز حکومت۔

حقوق آگاہی/معلومات تک رسائی

۔ ملازم پیشہ خواتین کا تحفظ

اسلامیات

تدریس مقاصد:

عمومی مقاصد: طالب علم یہ جان سکے کہ آیات قرآنی کی روشنی میں مومن کے اوصاف کیا ہیں

() قرآن مجید () منتخب آیات قرآنی

خصوصی مقاصد:

() قرآنی آیات کا ترجمہ

() قرآنی آیات کی تشریح

() قرآنی آیات کی روشنی میں ایک مومن کے اوصاف بیان کر سکے

() قرآنی آیات میں بیان کردہ مومن کے اوصاف اپنے اندر پیدا کر سکے

احادیث نبوی:

عمومی مقاصد:

() احادیث کی روشنی میں اسلامی اخلاقی اقدار (انفرادی واجتماعی) سے آگاہ ہو سکے

خصوصی مقاصد:

() احادیث کا ترجمہ بیان کر سکے

() احادیث کی تشریح کر سکے

() احادیث کی روشنی میں اسلام کی اخلاقی اقدار کی وضاحت کر سکے

() احادیث کی دی گئی تعلیمات کے مطابق اپنی زندگی گزار سکے

سیرت طیبہ:

() عمومی مقاصد: حضورﷺ کی سیرت طیبہ کے بارے میں جان سکے

خصوصی مقاصد:

() حضورﷺ کی ابتدائی زندگی اختصار کے ساتھ بیان کر سکے

() حضورﷺ کی ہجرت کا واقع بیان کر سکے

() حضورﷺ کی مدنی زندگی اختصار سے بیان کر سکے

() حضورﷺ کی بطور معلم خصوصیات بیان کر سکے

() حضورﷺ کی بطور سربراہ بیان کر سکے

حضورﷺ بحیثیت

() خطبہ حجۃ الوداع ۔انسانی حقوق کا اعلامیہ رحقوق انسانی پالیسی 2018 ۔ کے بارے جان سکے

اسلامی معاشرہ:

عمومی مقاصد: اسلامی معاشرہ کی خصوصیات سے آگاہی حاصل کر سکے

خصوصی مقاصد:

() اسلامی معاشرہ کا معنی ومفہوم کر سکے

() اسلامی معاشرہ کی امتیازی خصوصیات بیان کر سکے

() اسلامی معاشرہ میں عدل واحسان کی اہمیت بیان کر سکے

() تبلیغ کے لغوی معنی بیان کر سکے

() تبلیغ کی اہمیت اور ضرورت بیان کر سکے

() جہاد کے لفظی واصطلاحی معنی بیان کر سکے

() جہاد کی اہمیت بیان کر سکے

() جہاد اور قتل میں فرق بیان کر سکے

() جہاد کی مختلف اقسام بیان کر سکے

() لفظ مسجد کی تعریف بیان کر سکے

() مسجد کی سابقہ حیثیت کو بحال کرنے کے بارے میں اقدامات کو مان سکے

() انسانی حقوق کی معاشی اور معاشرتی ترقی میں اہمیت اور کردار بیان کر سکے

اسلامی ریاست:

عمومی مقاصد:

() اسلامی ریاست کی خصوصیات بیان کر سکے

خصوصی مقاصد:

() ریاست کی تعریف بیان کر سکے

() اسلامی ریاست میں طرز حکومت سے آگاہی حاصل کر سکے

() اسلامی ریاست کی خصوصیات بیان کر سکے

() اسلامی ریاست کے اغراض ومقاصد بیان کر سکے

() اسلامی ریاست کے قیام کی لیے جدوجہد کر سکے

() حقوق آگاہی رمعلومات تک رسائی کا قانون جان سکے

() ملازمت پیشہ خواتین کے حقوق کا تحفظ جان سکے اور

() معاشرے میں خواتین کے حقوق کا تحفظ یقینی بنائے

نصاب مطالعہ پاکستان

سی	پی	ٹی
1	0	1

سال دوئم

حصہ دوم

کل وقت 12 گھنٹے

موضوعات:

() دوقومی نظریہ

() تحریک پاکستان

() انڈین کانگریس

() مسلم لیگ

() تقسیم بنگال

() میثاق لکھنو

() تحریک خلافت

() سندھو تحریک

() تجاویز دہلی

() نہرو رپورٹ

() قائداعظم کے چودہ نکات

() خطبہ آلہ آباد

() انتخابات 1938 اور انتقال اقتدار

() قرارداد پاکستان

حصہ دوم

مطالعہ پاکستان

تدریس مقاصد:

تحریک پاکستان:

عمومی مقاصد:

() قیام پاکستان کے اسباب وتحریک کو بیان کر سکے

خصوصی مقاصد:

() قومیت کے مفہوم کو بیان کر سکے

() دو قومی نظریہ کی تعریف وتوضیح کر سکے

() دوقومی نظریہ کی اہمیت بیان کر سکے

() ہندوستانی مسلمانوں کی محرومیوں کو بیان کر سکے

() قومی تشخص کو بحال رکھنے کے لیے مسلمانان ہند کی مساعی بیان کر سکے

() آزادی ہند اور قیام پاکستان علامہ اقبال اور قائداعظم کی مساعی بیان کریں

() قیام پاکستان سے مستقبل اسلامی مملکت کے قیام کے لیے مسلم عوام کی کوششوں کو بیان کر سکے

() مسلم لیگ کے قیام پاکستان کے لیے جدو جہد بیان کر سکے

(غیر مسلم طلباء کے لیے)

نصاب اخلاقیات

ٹی	پی	سی
1	0	1

سال دوم

کل وقت 20 گھنٹے

موضوعات:

معاشرتی اقدار بلحاظ ہمسایہ۔قوم۔قومی سطح۔شہری سطح۔صنعتی اداروں کی سطح۔ضروریات۔ورثہ

() حقوق وفرائض

() قوت برداشت

() قوت ارادی

() لگن وجذبہ

() وسیع النظری

() بے غرضی

() انسانی دوستی

() حفاظتی شعور

() پاس آزادی

() کامل آگاہی

() تغیرات کو قبول کرنا

() خودشناسی

() انسانی حقوق کا اعلامیہ/حقوق انسانی پالیسی 2018

() انسانی حقوق کا معاشرتی اور معاشی ترقی میں کردار

() حقوق آگاہی/معلومات تک رسائی۔ملازم پیشہ خواتین کا تحفظ

نصاب اخلاقیات

سال دوم

تدریس مقاصد:

طالب علم اخلاقیات کی اہمیت وضرورت سے آگاہ ہو سکے اور بیان کر سکے

خصوصی مقاصد: طالب علم اس قابل ہو کہ

() موضوعات کا مطلب بیان کر سکے

() عملی زندگی سے مثالوں کی نشاندہی کر سکے

() اپنی شخصیت اور معاشرے پر موضوعات کے مطابق اثرات پیدا کرنے کے طریقے بیان کر سکے

() اعلیٰ اخلاقی اقدار میں سے قوت برداشت۔قوت ارادی۔لگن وجذبہ۔وسیع النظری۔بے غرض۔انسانی دوستی شعور۔پاس آزادی۔کامل آگاہی اور خود شناسی کی اہمیت

() اخلاقیات سے متصف ہو کر قومی خدمت بہتر طور پر انجام دے سکے

() انسانی حقوق کا اعلامیہ/حقوق انسانی کی پالیسی 2018 کے بارے میں جان سکے

() انسانی حقوق کا معاشرتی اور معاشی ترقی میں اہمیت اور کردار بیان کر سکے

() حقوق اگاہی/معلومات تک رسائی کے قانون کو جان سکے

() ملازم پیشہ خواتین کا تحفظ کو اخلاقیات کا حصہ تصور کرے

TTQ-211 / Civic-211; Tarjumat-ul-Quran / Civics

T	P	C
1	0	1

Total Contact Hours:

Theory: **32**

Practical: **0**

Note: Syllabi for these subject would be as per BISEs / General education, developed by Punjab Curriculum TextBook Board (PCTB)

MATH-233 APPLIED MATHEMATICS-II

Total Contact Hours

		T	P	C
Theory	96			
Practical	0	3	0	3

Pre-requisite: Must have completed Mathematics-I.

AIMS At the end of the course, the students will be able to:
Solve problems of Calculus, Laplace Transformation and Fourier Series, and develop mathematical skills and logical perceptions in the use of mathematical instruments.

COURSE CONTENTS

1. FUNCTIONS & LIMITS. 6 hours

1.1 Constant & Variable Quantities
1.2 Functions & their classification
1.3 The concept of Limit
1.4 Limit of a Function
1.5 Fundamental Theorems on Limit
1.6 Some important Limits
1.7 Problems

2. DIFFERENTIATION 6 hours

2.1 Increments
2.2 Differential Coefficient or Derivative
2.3 Differentiation ab-initio or by first Principle
2.4 Geometrical Interpretation of Differential Coefficient
2.5 Differential Coefficient of X^n and $(ax + b)^n$
2.6 Three important rules
2.7 Problems

3. DIFFERENTIATION OF ALGEBRAIC FUNCTIONS 9 hours

3.1 Explicit Functions
3.2 Implicit Functions
3.3 Parametric forms
3.4 Problems

4. DIFFERENTIATION OF TRIGONOMETRIC FUNCTIONS 6 hours

4.1 Differential Coefficient of Sin x, Cos x, Tan x from first principle.
4.2 Differential Coefficient of Cosec x, Sec x, Cot x
4.3 Differential Coefficient of Inverse trigonometric functions.
4.4 Problems.

5. DIFFERENTIATION OF LOGARITHMIC & EXPONENTIAL FUNCTIONS 6 hours

5.1 Differentiation of ln x

5.2 Differentiation of Log a^x
5.3 Differentiation of a^x
5.4 Differentiation of e^x
5.5 Problems

6. RATE OF CHANGE OF VARIABLES **6 hours**
6.1 Increasing and decreasing functions
6.2 Maxima and Minima
6.3 Criteria for maximum & minimum values
6.4 Methods of finding maximum & minimum
6.5 Rate measure
6.6 Slope of a line
6.7 Velocity and acceleration
6.8 Problems

7. INTEGRATION(SIMPLE BASIC RULES) **9 hours**
7.1 Concept
7.2 Fundamental Formulas
7.3 Important Rules
7.4 Problems

8. METHODS OF INTEGRATION **9 hours**
8.1 Integration by substitution
8.2 Integration by parts
8.3 Problems

9. DEFINITE INTEGRALS **6 hours**
9.1 Properties
9.2 Application to area
9.3 Problems

10. DIFFERENTIAL EQUATIONS **6 hours**
10.1 Introduction
10.2 Order and Degree
10.3 First order Differential Equation of Ist degree.
10.4 Solution of problems
10.5 Problems

11. LAPLACE TRANSFORMATIONS **9 hours**
11.1 Laplace Transformations
11.2 Inverse Laplace Transformations
11.3 Problems.

12. FOURIER SERIES. **9 hours**
12.1 Introduction
12.2 Periodic Functions
12.3 Even and Odd Functions
12.4 Problems

13. STATISTICS **9 hours**
13.1 Concept of mean, median and mode

13.2 Standard Deviation
13.3 Laws of probability
13.4 Problems

RECOMMENDED BOOKS:-

1. Text Book of Math-233, developed by Curriculum Section, Academics wing TEVTA and published by National Book Foundation (NBF).

MATH-233 APPLIED MATHEMATICS-II

INSTRUCTIONAL OBJECTIVES

1. USE THE CONCEPT OF FUNCTIONS AND THEIR LIMITS IN SOLVING SIMPLE PROBLEMS.

1.1 Define a function.
1.2 List all types of functions.
1.3 Explain the concept of limit and limit of a function.
1.4 Explain fundamental theorems on limits.
1.5 Derive some important limits.
1.6 Solve simple problems on limits.

2. UNDERSTAND THE CONCEPT OF DIFFERENTIAL COEFFICIENT.

2.1 Define differential coefficient.
2.2 Derive mathematical expression of a derivative.
2.3 Explain geometrically the meaning of differential coefficient.
2.4 Differentiate ab-initio x^n and $(ax+b)^n$.
2.5 Solve problems of these formulas.

3. USE RULES OF DIFFERENTIATION FOR SOLVING PROBLEMS OF ALGEBRAIC FUNCTIONS.

3.1 Derive product rule, quotient rule and chain rule.
3.2 Interpret the chain rule.
3.3 Differentiate explicit and implicit functions.
3.4 Find derivatives of parametric forms of a function w.r.t another function, by rationalization.
3.5 Use these important rules to find derivatives of relevant functions.

4. USE RULES OF DIFFERENTIATION TO SOLVE TRIGONOMETRIC FUNCTIONS.

4.1 Differentiate from first principle sin x, Cos x, tan x.
4.2 Derive formulas for derivatives of Sec x, Cosec x, Cot x.
4.3 Find derivatives of inverse trignometric functions.
4.4 Solve problems based on these formulas.

5. USE RULES OF DIFFERENTIATION TO LOGARITHMIC AND EXPONENTIAL FUNCTIONS.

5.1 Derive formulas for differential coefficients of logarithmic and exponential functions.
5.2 Solve problems using these formulae.

6. UNDERSTAND RATE OF CHANGE OF ONE VARIABLE WITH ANOTHER

6.1 Derive formulas for velocity, acceleration and slope of a line
6.2 Use derivative as a measure of rate of change.
6.3 Explain an increasing and a decreasing function.
6.4 Show graphically maxima and minima values and point of inflexion.
6.5 Explain criteria for finding maxima and minima.
6.6 Solve problems based upon these topics.

7. USE PRINCIPLES OF INTEGRATION IN SOLVING RELEVANT PROBLEMS.

7.1 Explain concept of integration.

7.2 Write basic theorems of integration.
7.3 Define fundamental formulas of integration.
7.4 List some important rules of integration.
7.5 Solve problems based on these rules.

8. UNDERSTAND VARIOUS METHODS OF INTEGRATION

8.1 List standard formulas of integration.
8.2 Integrate a function by substitution method.
8.3 Use method of integration by parts for finding integrals.
8.4 Employ these methods to solve problems.

9. UNDERSTAND THE METHODS OF SOLVING DEFINITE INTEGRALS.

9.1 Define definite integral.
9.2 List properties of definite integrals.
9.3 Use definite integral in the computation of areas.
9.4 Solve problems involving definite integrals.

10. USE DIFFERENT METHODS OF INTEGRATION TO SOLVE DIFFERENTIAL EQUATIONS.

10.1 Define a differential equation, its degree and order.
10.2 Explain method of separation of variables for solving differential equations of first order and first degree.
10.3 Solve differential equations of first order and first degree.

11. USE LAPLACE AND INVERSE LAPLACE TRANSFORMATION FOR SOLVING PROBLEMS.

11.1 Define Laplace and Inverse Laplace Transformation
11.2 List properties of Laplace Transformation
11.3 Solve problems using Laplace Transformations

12. EXPAND FUNCTIONS USING FOURIER SERIES

12.1 Define a Fourier series.
12.2 Write extended rule of integration by parts.
12.3 Illustrate periodic functions, even and odd functions.
12.4 Explain Fourier expansion and Fourier constants.
12.5 Expand the given functions of Fourier series.

13. UNDERSTAND THE BASIC CONCEPTS OF STATISTICS

13.1 Define mean, median and mode
13.2 Explain standard deviation
13.3 State laws of probability
13.4 Calculate the above mentioned quantities using the proper formula

(MGM -231) Food Business Management

Total Contact Hours

		T	P	C
Theory	32			
Practical	0	1	0	1

Learning objectives: The student will be able to understand basic components of business, including business operations, marketing, and management. They will also learn how to plan and execute a small startup. The outcomes of this course will equip students to apply their knowledge in advanced courses, enhancing their understanding and insight.

1. Introduction **6 hours**

1.1. Concept of need and want
1.2. Factors of Production
1.3. Opportunity cost
1.4. Scarcity
1.5. Business & Its types
1.6. Types of Business organizations
1.7. Added value
1.8. Stages of Economy
1.9. Entrepreneurship & Entrepreneur

2. Introduction to Management **06 hours**

2.1. Definition and scope of management
2.2. Functions of management (planning, organizing, leading, controlling
2.3. Types of plans
2.4. Leadership styles
2.5. Communication and interpersonal skills
2.6. Concept of HRM
2.7. SWOT analysis

3. Food Marketing and Consumer Behavior **08 hours**

3.1. Definition Market, market Share and Food marketing
3.2. Mass vs Niche market
3.3. Marketing segmentation
3.4. Market research &Types
3.5. Marketing Mix (7Ps)
3.6. Product
3.7. Price
3.8. Place
3.9. Promotion
3.10. Branding and packaging

4. Food Operations Management **06 hours**

4.1. Food production planning and control
4.2. Methods of Production
4.3. Supply chain management
4.4. Inventory management and logistics
4.5. Quality control and assurance

5. Food Finance and Accounting **06 hours**

5.1. Financial management in food businesses
5.2. Accounting principles and practices
5.3. Budgeting and financial planning
5.4. . Cost control and profitability analysis

Recommended books:

6. Hansen, H. (2013). *Food economics: Industry and markets*. Routledge.
7. Galizzi, G., & Venturini, L. (Eds.). (2012). *Economics of innovation: the case of food industry*. Springer Science & Business Media.
8. Singh, R. P., & Singh, R. P. (2017). Food business management. CRC Press. doi: 10.1201/9781315154114
9. Davis, B., Lockwood, A., Pantelidis, I. S., & Alcott, P. (2018). *Food and beverage management*. Routledge.
10. Sanders, N. R. (2025). *Supply chain management: A global perspective*. John Wiley & Sons.

Mgm-231 INSTRUCTIONAL OBJECTIVES

1. **Introduction**
   - 1.1. Differentiate between need and want
   - 1.2. What are the Factors of Production
   - 1.3. Define Opportunity cost with example
   - 1.4. Define Scarcity
   - 1.5. What is business explain its types
   - 1.6. What are the different types of Business organizations
   - 1.7. What is Added value in the business
   - 1.8. Explain different Stages of Economy with examples
   - 1.9. Define Entrepreneurship & Entrepreneur

2. **Introduction to Management**
   - 2.1. Define management
   - 2.2. Explain the Functions of management
   - 2.3. What are the different types of plans in management
   - 2.4. What are Leadership styles?
   - 2.5. Define Communication and its types s
   - 2.6. What is human Resource management?
   - 2.7. Explain SWOT analysis with example

3. **Food Marketing and Consumer Behavior**

   - 3.1. Define Market, market Share and Food marketing
   - 3.2. What is the difference between Mass and Niche market
   - 3.3. Define Marketing segmentation
   - 3.4. What is Market research &briefly explain its Types
   - 3.5. What is Marketing Mix?
   - 3.6. Describes the stages of Product development?
   - 3.7. Enlist the different methods of pricing
   - 3.8. What are the different channels for product distribution?
   - 3.9. What are the different methods of Sale Promotion?
   - 3.10. What is brand Branding and packaging?

4. **Food Operations Management**
   - 4.1. What is productivity ?l
   - 4.2. What are the different Methods of Production
   - 4.3. How food Supply chain is managed ?
   - 4.4. What is Inventory management and logistics
   - 4.5. What is Quality control and assurance in food production?

5. **Food Finance and Accounting**
   - 5.1. What are the different sources of finance?
   - 5.2. What is income statement?
   - 5.3. What is account and accountant?
   - 5.4. What is balance sheet?
   - 5.5. .what is profitability analysis?

(FPPT-203) FRUITS AND VEGETABLES PROCESSING

Total Contact Hours:

	T	P	C
Theory: 64			
Practical: 96	2	3	3

Learning Outcomes: The student will be able to understand the biochemical composition and post-harvest physiology of fruits and vegetables to minimize losses and maintain quality. They will also learn various processing and preservation techniques, including canning, freezing, drying, and fermentation, to enhance shelf life and value addition, to add high-quality and marketable fruit and vegetable products on market shelves.

Course Contents

1. Introduction **10 Hrs.**

1.1. Classification of fruits and vegetables.
1.2. Composition and nutritional value of Fruits & Vegetables
1.3. Pre & post harvest losses
1.4. Storage changes in Fruits & Vegetables
1.5. Fruit and vegetable processing industry in Pakistan

2. Processing of Fruits & Vegetables **20 Hrs.**

2.1. Canning
2.2. Sun drying
2.3. Dehydration
2.4. Freeze Drying
2.5. Pickling
2.6. Coating

3. Fruits and Vegetables Products **20 Hrs.**

3.1. Beverages
3.2. Preserves
3.3. Sauces
3.4. Pickles
3.5. Soups
3.6. Fried products
3.7. Dried products
3.8. Frozen products
3.9. Pastes and purees
3.10. Gelatinized product
3.11. Fresh cut products (minimally processed)
3.12. Fruits and Vegetables By-products processing

4. Spoilage in Processed Fruits & Vegetables **6 Hrs.**

4.1. Spoilage of Fruit products

4.2. Spoilage of vegetable products

5. Quality Control in Fruits & Vegetables processing **8 Hrs.**

5.1. Raw material inspection

5.2. Cleaning & Sanitation

5.3. Pest control & IPM

5.4. Physicochemical & Microbiological testing

Recommended Books

1. J.A. Awan, 2007. Food Processing and Preservation, Unitech Communication, Faisalabad
2. Khan, K. A., Goyal, M. R., & Kalne, A. A. (Eds.). (2019). Processing of fruits and vegetables: From farm to fork. Apple Academic Press.
3. Jin, P. (Ed.). (2023). Latest advances in preservation technology for fresh fruit and vegetables. MDPI.
4. J.A. Awan and S.U. Rehman, 2005. Food Analysis Manual, Unitech Communications, Faisalabad.
5. Martin-Belloso, O., & Soliva-Fortuny, R. (Eds.). (2010). *Advances in fresh-cut fruits and vegetables processing*. CRC Press.

(FPPT-203) FRUITS AND VEGETABLES PROCESSING

INSTRUCTIONAL OBJECTIVES

1. **Introduction**
   - **1.1.** Give Classification of fruits and vegetables.
   - **1.2.** Describe the Composition and nutritional value of Fruits & Vegetables
   - **1.3.** Define Pre & post harvest losses
   - **1.4.** What type of postharvest changes take place in fruits and vegetables
   - **1.5.** Enlist Fruit and vegetable processing industry in Pakistan

2. **Processing of Fruits & Vegetables**
   - **2.1.** What is Canning?
   - **2.2.** Enlist unit operations of canning
   - **2.3.** Give difference between Sun drying & Dehydration
   - **2.4.** What is Freeze Drying
   - **2.5.** Define Pickling
   - **2.6.** What is Coating? Enlist methods of Coating

3. **Fruits and Vegetables Products**
   - **3.1.** Define Beverages
   - **3.2.** What are Preserves?
   - **3.3.** What are different types of Sauces?
   - **3.4.** Describe methods of Pickle preparation
   - **3.5.** What are Soups?
   - **3.6.** Give different categories of Fried products
   - **3.7.** What is the importance of Frozen products?
   - **3.8.** What are Pastes and purees?
   - **3.9.** Give the importance of Fresh cut products (minimally processed)

4. **Spoilage in Processed Fruits & Vegetables**
   - **4.1.** Describe the Spoilage of Fruit products
   - **4.2.** Describe Spoilage of vegetable products

5. **Quality Control in Fruits & Vegetables processing**
   - **5.1.** What is the criterion for raw material selection for fruits and vegetable processing?
   - **5.2.** Define Cleaning & Sanitation
   - **5.3.** Describe the Physicochemical & Microbiological methods for fruits and vegetables products.

(FPPT-203) FRUITS AND VEGETABLES PROCESSING

List of Practical **96 Hrs.**

1. Perform blanching of selected fruits
2. Perform blanching of selected vegetables
3. Perform sulfiting of vegetables
4. Prepare Canned fruits & Vegetables
5. Prepare fruit jam
6. Prepare marmalade
7. Prepare fruit drink
8. Prepare mixed pickle
9. Prepare fruit preserves
10. Prepare tomato ketchup
11. Prepare fruit squash
12. Prepare soup
13. Prepare sauces
14. Prepare French fries
15. Perform freezing of fruits & Vegetables
16. Industrial Visit

(FPPT-243) CEREALS & BAKING TECHNOLOGY

Total Contact Hours

Theory	64	T	P	C
Practical	96	2	3	3

Learning Outcomes: The student will be able to understand the composition, structure, and functionality of cereals and their derivatives in food processing. They will also learn the principles and techniques of baking, including dough development, leavening, and product quality enhancement to develop innovative, safe, and high-quality baked products.

Course Contents

1. **Introduction** **8 hours**
   - **1.1.** Cereals
   - **1.2.** Staple Food
   - **1.3.** Types of Cereals Grains
   - **1.4.** Structure and composition of cereal grain.
   - **1.5.** Grades and grading of Grains.
   - **1.6.** Storage of cereals
   - **1.7.** Factors affecting storage

2. **Wheat milling** **12 hours**
   - **2.1.** Dry milling of wheat
   - **2.2.** Handling, Blending, Cleaning.
   - **2.3.** Tempering.
   - **2.4.** Conditioning.
   - **2.5.** Grinding process.
   - **2.6.** Sieving process.
   - **2.7.** Extraction rates of flour.
   - **2.8.** Reduction and tailings.
   - **2.9.** Purification process.
   - **2.10.** Flour handling and storage.

3. **Rice Milling** **8 hours**
   - **3.1.** Sorting & grading of rice
   - **3.2.** Steamed rice
   - **3.3.** Parboiling of rice
   - **3.4.** Rice oil Bran
   - **3.5.** Rice flour
   - **3.6.** Quality parameters of finished products

4. Maize Processing **12 hours**

4.1. Types of corn flour
4.2. Production of starch.
4.3. Modified starches
4.4. Production of oil.
4.5. Production of gluten.
4.6. Production of corn grits
4.7. Finished products handling
4.8. Quality parameters of finished products

5. Baked Products **12 hours**

5.1. Baking ingredients
5.2. Dough methods
5.3. Pan bread
5.4. Flat bread.
5.5. Biscuits, cookies & crackers
5.6. Cakes
5.7. Wafers
5.8. Frozen dough
5.9. Finished products handling
5.10. Quality parameters of finished products

6. Extruded Products **12 hours**

6.1. Ingredients
6.2. Extrusion Technology
6.3. Pasta and its types
6.4. Corn flakes
6.5. Finished products handling
6.6. Quality parameters of finished products

Recommended Books:

1. Shewry, P. R., Koksel, H., & Taylor, J. R. (Eds.). (2023). *ICC handbook of 21st century cereal science and technology*. Elsevier.
2. das Graças Costa, E., & de Souza, P. M. (2023). Introduction to Cereals. In *Cereal-based food products* (pp. 1-24). Cham: Springer International Publishing.
3. Khetarpaul, N., Grewal, R. B., & Jood, S. (2015). *Bakery science and cereal technology*. Daya Publishing House.
4. Zhou, W., & Hui, Y. H. (Eds.). (2014). *Bakery products: Science and technology* . Wiley-Blackwell.
5. Ferreira Guiné, R. P., & Correia, P. M. R. (Eds.). (2013). Engineering aspects of cereal and cereal-based products. CRC Press.

(FPPT-243) CEREALS & BAKING TECHNOLOGY

INSTRUCTIONAL OBJECTIVES:

1. Introduction

1.1 Define cereals? Give examples of cereal grains?
1.2 What is scope of cereals in our life?
1.3 Explain structure and composition of cereal grain?
1.4 Describe grading criteria for cereal grains?
1.5 Describe storage systems for cereal grains?
1.6 Explain various factors affecting storage of cereal grains?

2. Wheat Milling

2.1 Define milling of wheat? Enlist milling operations of wheat?
2.2 Describe handling, blending & cleaning process of wheat for milling?
2.3 What is tempering & conditioning of wheat? Give objectives?
2.4 Explain grinding process of wheat grain?
2.5 What is sieving process? Write its advantages?
2.6 Define extraction rate of flour? Explain with examples?
2.7 Describe reduction and tailings of milling process?
2.8 What is role of purification process in wheat milling?
2.9 Describe flour handling and storage?

3. Rice Milling

3.1 What is sorting & grading of rice?
3.2 Describe processing of white and polished rice?
3.3 What is difference between white rice and polished rice?
3.4 What is steamed rice? Describe its types and uses?
3.5 Explain parboiling of rice?
3.6 What is wet milling of rice?
3.7 Describe processing of rice bran oil?
3.8 Explain processing of rice flour? Write uses of rice flour?
3.9 Describe quality parameters of finished products prepared from rice?

4. Maize Processing

4.1. Define types of corn flour (Yellow & golden)?
4.2. Describe production of corn starch?
4.3. What are modified starches?
4.4. Describe processing of corn oil?
4.5. Explain production of corn gluten?
4.6. What are uses of corn gluten?
4.7. Write processing of corn grits?
4.8. What are Corn pops?
4.9. Describe handling of finished corn products?

4.10. Describe quality parameters of finished corn products?

5. Baked Products

5.1. Enlist baking ingredients? Give their functions?
5.2. Describe technology of pan bread?
5.3. Describe processing of flat bread?
5.4. Describe technology of biscuits, cookies & crackers?
5.5. Explain processing of cakes?
5.6. Describe technology of wafers?
5.7. What is frozen dough? Write uses of frozen dough?
5.8. What is gluten free bread?
5.9. What is role of enzyme addition in dough?
5.10. Explain handling of finished baked products?
5.11. Describe quality parameters of finished baked products?

6. Extruded Products

6.1. Enlist and describe ingredients used in extruded products?
6.2. Describe extrusion technology?
6.3. Define pasta? Describe types of pasta?
6.4. What are uses of pasta?
6.5. Describe processing of Pops?
6.6. Explain technology of corn flakes?
6.7. Define snacks? Describe processing of snacks?
6.8. What is scope of snack food industry?
6.9. Describe handling of extruded products?
6.10. Explain quality parameters of extruded products?

(FPPT-243) CEREALS & BAKING TECHNOLOGY

List of Practical **96 Hrs.**

1 Determine Kernel weight of cereal grains
2 perform Test weight of wheat grains
3 Determine Moisture of selected cereals
4 Determine percentage of Foreign matter in grain sample
5 Perform Falling number test
6 Determine Aflatoxins in cereals (Qualitative method)
7 Preform sieve test cereals & products
8 Perform Ash test for cereals
9 Perform wet and dry gluten test for wheat flour
10 Prepare pita and tortilla bread
11 Prepare pizza
12 Prepare bread crumbs
13 Perform grading/sorting of rice grains
14 Perform Water absorption test for flour
15 Prepare pasta
16 Prepare gluten free bread
17 Prepare different types of cakes
18 Prepare different types of biscuits
19 Prepare different types of donuts/croissants
20 Prepare frozen dough
21 Prepare pan bread
22 Visit to a flour mill.
23 Visit to modern rice mill.
24 Visit to a baking industry.

(FPPT-253) DAIRY PROCESSING

Total Contact Hours				
Theory	**64**	**T**	**P**	**C**
Practical	**96**	**2**	**3**	**3**

Learning Outcomes: The students will be able to understand the composition, properties, and microbiology of milk and its role as a raw material in dairy processing. They will also learn various processing techniques, including pasteurization, homogenization, fermentation, and packaging, to ensure product quality and safety to develop innovative and value-added dairy products while adhering to regulatory and quality standards.

Course Contents

1. Introduction **8 hours**

- **1.1.** Dairy
- **1.2.** Milk & Milk composition
- **1.3.** Milk Sources
- **1.4.** Milk collection & handling
- **1.5.** Global & Local Production of milk
- **1.6.** Dairy industry in Pakistan

2. Milk Reception & testing **6 hours**

- **2.1.** Reception
- **2.2.** Milk acceptance criteria
- **2.3.** Testing of milk
- **2.4.** Storage of milk

3. Milk Processing **8 hours**

- **3.1.** Cream separation
- **3.2.** Standardization
- **3.3.** Homogenization
- **3.4.** Pasteurization
- **3.5.** UHT Technology
- **3.6.** Packaging
- **3.7.** Cleaning In Dairy (CIP/COP)

4. Milk Products **8 hours**

- **4.1.** Pasteurized milk
- **4.2.** UHT milk
- **4.3.** Milk powder
- **4.4.** Yogurt
- **4.5.** Ice Cream

4.6. Milk Cream
4.7. Cheese
4.8. Butter
4.9. Desi ghee
4.10. Flavored milk/Drink

5. Cheese Processing **10 hours**
5.1. Classification, Composition and chemistry of cheese
5.2. Processing of cheddar, cottage, Mozzarella cheese
5.3. Packaging
5.4. Cheese By-Products
5.5. Quality control in cheese making

6. Cream Processing **8 hours**
6.1. Classification and composition of Creams
6.2. Unit operations in processing of creams
6.3. Quality control of the products

7. Yogurt Processing **8 hours**
7.1. Classification, Composition and chemistry of yoghurts
7.2. Unit operations in processing of yoghurt
7.3. Quality control of the products
7.4. Microbiology of yoghurt

8. Ice-cream processing **8 hours**
8.1. Classification, Composition and chemistry ice cream
8.2. Unit operations in processing of ice cream

Books Recommended:

1. Edited by Chandan, R. C., & Kilara, A. (2015). *Dairy processing and quality assurance* . Wiley-Blackwell.
2. Bylund, G. (2015). *Dairy processing handbook*. Tetra Pak Processing Systems AB.
3. Edited by Min, S., & Jang, H. D. (2020). *Dairy processing: Advanced research to applications*. Springer.
4. Edited by Nollet, L. M. L., & Toldrá, F. (2021). *Handbook of dairy foods analysis* CRC Press.
5. P.F. Fox, T.P.Guinee,T.M. Cogon and P.L.H.McSweeney, 2000. FundamentalsofCheese Science. ChapmanandHall, London.

(FPPT-253) DAIRY PROCESSING

INSTRUCTIONAL OBJECTIVES:

1. **Introduction**
   - **1.1.** What is dairy technology?
   - **1.2.** Define milk and describe milk composition?
   - **1.3.** Describe nutritional value of milk?
   - **1.4.** Describe milk Sources?
   - **1.5.** Explain milk collection & handling procedure?
   - **1.6.** What is global & local production of milk?
   - **1.7.** What is scope of dairy industry in Pakistan?

2. **Milk Reception & Testing**
   - **2.1.** Enlist measures adopted for milk receiving?
   - **2.2.** Enlist standards for milk acceptance?
   - **2.3.** Enlist quality tests of milk?
   - **2.4.** Enlist Describe quality tests of milk?
   - **2.5.** Describe storage conditions of milk?

3. **Milk Processing**
   - **3.1.** Describe cream separation process?
   - **3.2.** What is standardization of milk?
   - **3.3.** What is objective of homogenization?
   - **3.4.** Define pasteurization?
   - **3.5.** Describe pasteurization process for milk?
   - **3.6.** Explain UHT Technology?
   - **3.7.** Describe packaging techniques for milk?
   - **3.8.** Describe cleaning process (CIP/COP) in dairy industry?

4. **Milk Products**
   - **4.1.** What is difference between pasteurized milk & UHT milk?
   - **4.2.** What is flavored milk/drink?
   - **4.3.** Describe the technology for preparation of milk powder?
   - **4.4.** What is yogurt? Write its procedure?
   - **4.5.** What is ice cream?
   - **4.6.** Write uses of cheese?
   - **4.7.** Write process for butter making?
   - **4.8.** What is Desi ghee?

5. **Cheese Processing**
   - **5.1.** Define cheese? Mention classes of cheese?
   - **5.2.** Describe composition of cheese?
   - **5.3.** Explain processing of cheddar and mozzarella cheese?

5.4. What is cottage cheese?
5.5. Describe packaging of cheese?
5.6. What are uses of cheese by-products?
5.7. Describe quality control tests in cheese making?

6. Cream Processing

6.1. Enlist classes of cream?
6.2. Describe composition of creams?
6.3. Explain processing of cream?
6.4. Enlist quality control tests of cream?

7. Yogurt Processing

7.1. Define yoghurt?
7.2. Enlist types of yoghurt?
7.3. Describe composition of yoghurt?
7.4. Explain processing of yoghurt?
7.5. What is the microbiology of yoghurt?
7.6. What are the quality control tests for assessment of yoghurt?

8. Ice-Cream Processing

8.1. What is ice cream?
8.2. Enlist ingredients used in ice cream?
8.3. Describe composition and chemistry of ice cream?
8.4. Explain unit operations in processing of ice cream?
8.5. What is the quality control tests for assessment of ice cream?

(FPPT-253) DAIRY PROCESSING

List of Practical

1. Determine fat % in milk
2. Determine solids not fat (SNF) test in milk
3. Determine pH, Specific gravity, acidity of milk
4. Determine Refractive index of milk
5. Perform APT & COB test
6. Perform phosphatase test
7. Prepare flavored milk
8. Prepare whipped cream
9. Prepare ice cream
10. Prepare yogurt
11. Prepare butter
12. Prepare cheese
13. Prepare kefir
14. Determine total plate count in milk sample
15. Determine coli forms in milk and milk products
16. Perform sensory evaluation of raw and processed milk.
17. Visit to a dairy farm
18. Visit to a milk processing plant

(FPPT- 263) CONFECTIONERY AND SNACK FOODS

Total Contact Hours

Theory	**64**	**T**	**P**	**C**
Practical	**96**	**2**	**3**	**3**

Learning Outcomes: At the end of the course the students will be able to understand the science, ingredients, and techniques involved in the production of confectionery and snack foods. They will also learn about processing methods, quality control, and sensory evaluation to develop healthy, sustainable, and market-ready confectionery and snack food items.

Course Contents

1. Introduction **2 hour**

- **1.1.** Sugar process
- **1.2.** Add the use of artificial sweetener in confectionery processing
- **1.3.** Traditional sweets
- **1.4.** Processing Equipment
- **1.5.** Sugar industry in Pakistan
- **1.6.** Utilization of sugar
- **1.7.** Composition and nutritional value

2. Indigenous Sugar processing Technology **2hour**

- **2.1.** Small scale sugar production
- **2.2.** Gur
- **2.3.** Khund
- **2.4.** Shakar
- **2.5.** Sanitation and hygienic condition

3. Sugar manufacturing **4 hours**

- **3.1.** Unit operations
- **3.2.** Juice extraction
- **3.3.** Purification
- **3.4.** Heating
- **3.5.** Evaporation
- **3.6.** Crystallization
- **3.7.** Crystallization in motion
- **3.8.** Production of brown sugar
- **3.9.** Production of sugar from sugar beet

4. Refining **8hours**

- **4.1.** Refining of sugar (Affination, Clarification, Carbonation Sulfitation, Phosphitation, Drying, packing and storage)

4.2. Recent advances in sugar technology
4.3. Packaging and storage of sugar
4.4. Properties of sugar
4.5. Quality control

5. Confectionery **10 hours**

5.1. Confectionery industry in Pakistan
5.2. Ingredients &Classification,
5.3. Composition and functions of ingredients used in confectionery
5.4. Sugar confectionery: formulation and manufacture
5.5. Processing of hardboiled sweets, toffee and Fudge
5.6. Formulation and manufacture processes of gums and jellies
5.7. Formulation and manufacture of chocolate confectionery
5.8. Manufacturing of candy, toffee, fondant, fudge, jam/jellies, syrups, preserves, gums,
5.9. Manufacturing of different types of chocolate
5.10. Packaging and labeling
5.11. Storage standard
5.12. Flour based confection biscuits, cookies, muffins, cupcake, cakes, and doughnuts

6. Snack Foods **06 Hours**

6.1. Definition and classification of snack foods
6.2. Types of snack food ingredients (grains, nuts, seeds)
6.3. Processing of Savory snacks (chips, nimko, crakers)
6.4. Processing of extruded snacks (Kurkure, slanty)
6.5. Processing of healthy snacks (energy bars, nuts, seeds, legumes)
6.6. . Processing of specialty snacks (Gluten free, vegan)

Books Recommended:

1 Mathur, R.B.I. (2023). Cane sugar technology: The complete reference. Amazon Kindle Direct Publishing.

2 E.B. Jacjson, 1995.Sugar ConfectioneryManufacture.. Balckie Academicand Professional Wester,Glassgow.

3 C. Chen, 2001.TheSugar Refining–A Manualfor the Design andRefiningFacilities, JohnWileyand Sons, London.4 W.P.Edwards, 2000.The Science ofSugar Confectionery, Royal Societyof Chemistry, Cambridge

4 Hartel, R. W., von Elbe, J. H., & Hofberger, R. (2018). *Confectionery science and technology*. Springer.

5 Caras, F. (editor). (2021). Sugar: Processing, production and uses. Nova Science Publishers.

(FPPT- 263) CONFECTIONERY AND SNACK FOODS

INSTRUCTIONAL OBJECTIVES

1. **Introduction**
   - **1.1.** What are sugars?
   - **1.2.** Describe the use of artificial sweetener in confectionery processing
   - **1.3.** What are Traditional sweets
   - **1.4.** Enlist different Processing Equipment in confectionary
   - **1.5.** Enlist Sugar industry in Pakistan
   - **1.6.** Give the different uses of sugar
   - **1.7.** Give the nutritional values of different sugars

2. **Indigenous Sugar processing Technology**
   - **2.1.** What is the "Gur"?
   - **2.2.** What is Khand?
   - **2.3.** What is "Shakar"?

3. **Sugar manufacturing**
   - **3.1.** Enlist different Unit operations in sugar manufacturing
   - **3.2.** What is Crystallization in sugar manufacturing
   - **3.3.** Define Evaporation
   - **3.4.** Describe the Production of brown sugar
   - **3.5.** Describe Production of sugar from sugar beet

4. **Refining**
   - **4.1.** Enlist the diffent steps in Refining of sugar
   - **4.2.** Describes Recent advances in sugar industry
   - **4.3.** Give Properties of sugar

5. **Confectionery**
   - **5.1.** Define Confectionery
   - **5.2.** Enlist important Ingredients used in confectionary industry
   - **5.3.** What are functions of ingredients used in confectionery
   - **5.4.** Describe the Processing of hardboiled sweets,
   - **5.5.** Describe the Processing of toffee and Fudge
   - **5.6.** Describe the Processing of gums and jellies
   - **5.7.** Describe the Processing chocolate
   - **5.8.** Decribes Flour based confection biscuits, cookies, muffins, cupcake, cakes, and doughnuts

6. Snack Foods

6.1. Define and classify snack foods

6.2. what are different types of snack food ingredients

6.3. Describe the Processing of Savory snacks

6.4. Describe the Processing of extruded snacks

6.5. Describe the Processing of healthy snacks

6.6. Describe the Processing of specialty snacks

(FPPT- 263) CONFECTIONERY AND SNACK FOODS

List of Practical **96hour**

1. Determine TSS of selected foods
2. Determine pH of sugarcane juice
3. Perform clarification of raw juice
4. Determine density of juice by Picnometer
5. Determine the turbidity of juice by Turbidity meter
6. Determine total sugar of juice
7. Visit to sugar industry
8. Visit to confectionery unit
9. Prepare candy, toffee and other sugar-based confectionery
10. Prepare high fructose corn syrup
11. Determine moisture of selected food products
12. Prepare candies and toffee
13. Prepare jellies
14. Prepare peanut bar
15. Identify artificial sweetener
16. Prepare jam of seasonal fruits
17. Prepare fruit syrup
18. Preparer different types of preserves
19. Visit to sugar or confectionary unit.

(FPPT-272) FOOD MICROBIOLOGY

	Total Contact Hours			
2Theory	32	T	P	C
Practical	96	1	3	2

Learning Outcomes: The student will be able to understand the basic principles of Food microbiology and the harmful and beneficial effects of microbial activities during food processing and preservation.

Course Contents

1. Introduction **4 hours**

- **1.1.** Microorganisms
- **1.2.** Microbiology
- **1.3.** Allied branches of Microbiology
- **1.4.** Food Microbiology
- **1.5.** Classification of microorganisms
- **1.6.** Microorganisms important in food

2. Important Microbes in Food **4 hours**

- **2.1.** Bacteria
- **2.2.** Fungi (Yeast & Mold)
- **2.3.** Virus

3. Sources of Microbial Contamination **3 hours**

- **3.1.** Soil
- **3.2.** Animals
- **3.3.** Sewage
- **3.4.** Water
- **3.5.** Air
- **3.6.** Plants
- **3.7.** Handling & Processing
- **3.8.** Contamination and cross contamination

4. Factor Affecting the Growth of Microbes **4 hours**

- **4.1.** Intrinsic & Extrinsic factors
- **4.2.** Nutrients
- **4.3.** Moisture/water activity
- **4.4.** Hydrogen ion concentration (pH)
- **4.5.** Oxidation reduction potential
- **4.6.** Inhibitory substances
- **4.7.** Biological structure
- **4.8.** Temperature

4.9. Atmosphere
4.10. Humidity

5. Control of Microorganisms **4 hours**
5.1. Fundamentals of microbial control
5.2. Control by physical means
5.3. Control by chemical agents
5.4. Antibiotics and other chemotherapeutic agents

6. Microbial Spoilage **6 hours**
6.1. Microbial food spoilage
6.2. Characteristics of some spoilage organisms
6.3. Microbial spoilage of Meat and meat Products
6.4. Microbial spoilage of Milk and milk products
6.5. Microbial spoilage of Beverages
6.6. Microbial spoilage Fruits and vegetable
6.7. Microbial spoilage cereal and Bakery items
6.8. Microbial spoilage of egg, honey and spices

7. Food Borne Diseases **4 hours**
7.1. Food borne infections
7.2. Food borne intoxications
7.3. Nonbacterial Food poisoning

8. Production of Cultures for Food fermentations **3 hours**
8.1. General principles of culture preparation and maintenance
8.2. Culture preservation
8.3. Bacterial cultures
8.4. Yeast cultures

Recommended Books

1. Frazier, W.C. and Westhoff, D.C. (1988). Food Microbiology, NewYork: McGraw HillBook Co.
2. Jay, J. M. (1996). Modern Food Microbiology Food and Nutrition Press. ISB#0-412-076-918.
3. Awan, J.A.and.Rehman, S.U. (2005). Microbiology Manual, Faisalabad: Unitech Communications
4. Ray, B., & Bhunia, A. (2008). Fundamental food microbiology CRC.
5. Doyle, M. P., Beuchat, L. R., and Montville, T. J. (2021). Food Microbiology: Fundamentals and Frontiers. UK:ASM Press,

(FPPT-272) FOOD MICROBIOLOGY

INSTRUCTIONAL OBJECTIVES

1. **Introduction**
   - **1.1.** Define microorganisms,
   - **1.2.** What is microbiology?
   - **1.3.** Define food microbiology
   - **1.4.** Describe the scope of Food microbiology
   - **1.5.** Enlist allied branches of microbiology
   - **1.6.** Give classification of microorganisms
2. **Important Microbes in Food**
   - **2.1.** Name different types of microorganisms in food
   - **2.2.** What is the difference between Yeast & Mold
   - **2.3.** Describe the structure of Bacteria
   - **2.4.** Describe the structure of yeast and mold
   - **2.5.** What are viruses?
3. **Sources of Microbial Contamination**
   - **3.1.** Enlist the different sources of microbial contamination
   - **3.2.** Differentiate Contamination and cross contamination
4. **Factor Affecting the Growth of Microbes**
   - **4.1.** What are Intrinsic & Extrinsic factors that affect the growth of microorganism?
   - **4.2.** Define water activity
   - **4.3.** Give examples of different antimicrobial agents
   - **4.4.** What is modified atmosphere ?
5. **Control of Microorganisms**
   - **5.1.** Name the different methods for microbial control
   - **5.2.** Enlist methods of microbial Control by physical means
   - **5.3.** Enlist methods of microbial Control by chemical agents
   - **5.4.** What are Antibiotics ?
6. **Microbial Spoilage**
   - **6.1.** Describe Microbial food spoilage
   - **6.2.** Give some Characteristics of spoilage organisms
   - **6.3.** Describe the Microbial spoilage of Meat and meat Products
   - **6.4.** Describe the Microbial spoilage of Milk and milk products
   - **6.5.** Enlist Microbial spoilage changes in Beverages
   - **6.6.** Enlist Microbial spoilage changes in Fruits and vegetable
   - **6.7.** Enlist Microbial spoilage changes in cereal and Bakery items
   - **6.8.** Enlist Microbial spoilage changes spoilage of egg,
7. **Food Borne Diseases**

7.1. What is Food borne infections?
7.2. Define Food borne intoxications
7.3. Give Nonbacterial Food poisoning agents

8. Production of Cultures for Food fermentations
8.1. Define culture and enlist types of culture
8.2. Enlist methods for the preservation of culture

(FPPT-272) FOOD MICROBIOLOGY

List of Practical **96 hours**

1. Implement Safety precautions in Food microbiology lab
2. Identify use of Food microbiology lab equipment
3. Perform sterilization using autoclave and hot air oven
4. Prepare slide for microscope examine
5. Perform direct examination of food sample by microscope
6. Prepare different types of culture media
7. Perform Ubiquity of microbes (Collect microorganisms from selected sources Hands, shirts, room. Utensils)
8. Examine yeasts, mold and bacteria growth
9. Perform swab and dilution tests for assessing cleaning efficiency
10. Perform isolation of bacteria from selected sources
11. Examine bacterial colonies
12. Determine microbial load in selected food samples
13. Perform MBRT test for milk
14. Visit to a food industry/Research institute

(FPPT-282) FOOD CHEMISTRY AND ANALYSIS

Total Contact Hours:

	T	P	C
Theory: 32			
Practical: 96	1	3	2

Learning Outcomes: The students will be able to understand the chemical composition of food, including carbohydrates, proteins, lipids, vitamins, and minerals, and their role in food quality and nutrition. They will also learn analytical techniques for evaluating the physical and chemical properties of food components.

Course Contents

1. **Introduction** **3 hours**
   - **1.1.** Food Chemistry
   - **1.2.** Nutrients
   - **1.3.** Macro- nutrients
   - **1.4.** Micro-nutrients
   - **1.5.** Food Composition
   - **1.6.** Food Analysis
   - **1.7.** Oxidation & reduction

2. **Water** **4 hours**
   - **2.1.** Nature of water in food
   - **2.2.** Water activity and food spoilage
   - **2.3.** Physical and chemical properties

3. **Carbohydrates** **4**hours
   - **3.1.** Classification
   - **3.2.** Chemical structure
   - **3.3.** Physical and chemical properties

4. **Lipids** **4** hours
   - **4.1.** Fatty acids
   - **4.2.** Physical and chemical properties of fatty acids
   - **4.3.** Rancidity
   - **4.4.** Functional properties in foods

5. **Proteins** **4** hours
   - **5.1.** Amino acids and its classification
   - **5.2.** Physical and chemical properties
   - **5.3.** Functional properties in foods

6. **Other Constituents** **4** hours

6.1. Vitamins
6.2. Minerals
6.3. Pigments
6.4. Aromatic compounds
6.5. Anti-nutritional compounds
6.6. Organic acids

7. Sampling techniques **4** hours
7.1. Sample and its types
7.2. Sampling procedure
7.3. Sample preparation
7.4. Sampling instruments
7.5. Sample storage

8. Basic and advance Methods of Food Analysis **5** hours
8.1. Proximate Analysis
8.2. Titration
8.3. Texture analysis
8.4. spectrophotometry
8.5. Chromatography
8.6. Nuclear Magnetic resonance
8.7. Fourier transform infrared (FTIR)
8.8. Enzyme Linked Immunosorbent Assay (ELISA)
8.9. Polymerase chain Reaction (PCR)

Recommended Books.

1. Awan, J.A. Food and Nutrition. (2005). Faisalabad:Unitech Communications.
2. A.O.A.C. (2005). Official Methods of Analysis . Arlington:.Association of Official Analytical Chemists.
3. Nielson, S.S. (2003). Food Analysis Laboratory Manual. USA : Chips Limited.
4. . Awan, J.A. and Rehman, S.U. (2005). Food Analysis Manual. Faisalabad: Unitech Communications, 2005.
5. Khalil, I.A and Manan, F. (1990). Chemistry-I-Bio-analytical Chemistry . Peshawar: Tajkutabkhana,

(FPPT-282) FOOD CHEMISTRY AND ANALYSIS

Instructional objectives:

1. **Introduction**
   - **1.1.** Define food chemistry.
   - **1.2.** What are the major food components?
   - **1.3.** Define nutrients.
   - **1.4.** How does water affect the texture and quality of food?
   - **1.5.** Define Micro and macro nutrients.
   - **1.6.** Define Food Analysis?
2. **Water**
   - **2.1.** What is the nature of water in food?
   - **2.2.** Why is water an essential component of food?
   - **2.3.** What is the difference between bound water and free water in food?
   - **2.4.** How does water content affect the shelf life of food products?
   - **2.5.** What is water activity, and how does it impact food preservation?
   - **2.6.** How does the presence of water influence the solubility of food components?
3. **Carbohydrates**
   - **3.1.** What are carbohydrates made of?
   - **3.2.** Describe the classification of carbohydrates.
   - **3.3.** Name types of carbohydrates found in food.
   - **3.4.** What is the role of fiber in carbohydrates, and why is it important for health?
   - **3.5.** Describe physical and chemical properties of carbohydrates.
4. **Lipids**
   - **4.1.** What are lipids, and what are their main components?
   - **4.2.** Define fatty acids.
   - **4.3.** Name types of lipids commonly found in food.
   - **4.4.** What is the primary function of lipids in the human body?
   - **4.5.** What is the difference between saturated and unsaturated fats?
   - **4.6.** What is the significance of omega-3 fatty acids in food?
   - **4.7.** Define rancidity.
   - **4.8.** What are the functional properties of lipids in foods?
5. **Proteins**
   - **5.1.** What are proteins?
   - **5.2.** What are amino acids and its classification?
   - **5.3.** Name sources of proteins in food.
   - **5.4.** What is the primary function of proteins in the human body?
   - **5.5.** What is the difference between complete and incomplete proteins?
   - **5.6.** What is denaturation of proteins, and how does it occur in food?
   - **5.7.** What are the functional properties of protein in food?
6. **Other Constituents**
   - **6.1.** What are vitamins and their types?
   - **6.2.** What are minerals?
   - **6.3.** What are food additives and their types?

6.4. What are pigments and describe their uses?
6.5. What are aromatic compounds and their types?
6.6. Enlist the anti-nutritional compounds.
6.7. What are organic acids and their types?

7. Sampling techniques

7.1. What is sample and its types?
7.2. Name common methods of food sampling.
7.3. What is sampling procedure?
7.4. What are sampling instruments?
7.5. What is sample storage?

8. Basic and advance Methods of Food Analysis

8.1. What is refractometer?
8.2. What is Proximate Analysis?
8.3. Define chromatography?
8.4. What is Titration?
8.5. Define Texture analysis.
8.6. What is Spectrophotometry?
8.7. What is Nuclear Magnetic resonance (NMR)?
8.8. What is Fourier transform infrared (FTIR)?
8.9. What is Enzyme Linked Immunosorbent Assay (ELISA).
8.10. What is Polymerase chain Reaction (PCR)?

(FPPT-282) FOOD CHEMISTRY AND ANALYSIS

List of Practical: **96Hrs.**

1. implement Lab Safety Rules
2. Identify equipment and glassware
3. Prepare Normal solutions
4. Prepare Molar solutions
5. Prepare Percent solutions
6. Determination of moisture.
7. Determination of ash
8. Determination of NFE
9. Determination of crude protein
10. Determination of crude fat
11. Determination of water activity in selected foods
12. Determination of pH of selected foods
13. Determination of Acidity of selected foods
14. Determination of viscosity of liquid foods.
15. Determination of reducing sugars
16. Determination of total sugars
17. Determination of vitamin C.
18. Visit to a local food testing facility.

(FPPT-293) Beverages Processing

Total Contact Hours

Theory	64	T	P	C
Practical	96	2	3	3

Learning Outcomes: The students will be able to understand the raw materials, formulation, and production techniques used in the manufacture of various beverages, including alcoholic and non-alcoholic types. They will also learn about quality control, packaging, and preservation methods to ensure beverage safety, stability, and shelf life.

Course Contents

1. **Fundamentals of Beverages** **12 Hrs**
   - **1.1.** Introduction
   - **1.2.** Classification
   - **1.3.** Beverage industry in Pakistan
   - **1.4.** Nutritional status
   - **1.5.** Beverage ingredients
   - **1.6.** RTS and RTD
   - **1.7.** Fruit drinks, Juices, flavored drinks, sherbets and Nectars
   - **1.8.** Types of Coffee & Tea
   - **1.9.** Dietetic drinks
   - **1.10.** Energy drinks

2. **Ingredients for Beverage Production** **22 Hrs.**
   - **2.1.** Fruit pulps
   - **2.2.** Juices
   - **2.3.** Concentrates and other additives
   - **2.4.** Sweeteners
   - **2.5.** Sugar and artificial sweeteners
   - **2.6.** Colors
   - **2.7.** Flavors
   - **2.8.** Preservatives
   - **2.9.** Cocoa and cocoa beans
   - **2.10.** Milk
   - **2.11.** Stabilizers and thickeners

3. **Beverage Processing and Packaging** **22 Hrs.**
   - **3.1.** Unit operations in production
   - **3.2.** Raw material handling and storage.
   - **3.3.** Fruit based beverages
   - **3.4.** Juice concentrates
   - **3.5.** Fruit flavored powders
   - **3.6.** Barley water

3.7. Carbonated beverages
3.8. Flavored Drinks
3.9. Low calorie beverages
3.10. Tea processing
3.11. Traditional beverages production
3.12. Trouble shooting in beverage industry
3.13. Packaging material for beverages

4. Quality Control Routines in Beverage Processing **08 Hrs.**

4.1. Drinking water testing (TDS, Hardness, pH, alkalinity)
4.2. Determination of brix
4.3. Determination of acidity
4.4. Water, Sources and purification
4.5. Types of water purification systems (RO, Micro filtration)
4.6. Quality control in beverage industry
4.7. Plant sanitation

RECOMMENDED BOOKS:

1. Tan, W. K., Husin, Z., Yasruddin, M. L., & Ismail, M. A. H. (2023). Recent technology for food and beverage quality assessment: a review. *Journal of Food Science and Technology*, *60*(6), 1681-1694.
2. Telukdarie, A., Munsamy, M., Katsumbe, T. H., Maphisa, X., & Philbin, S. P. (2023). Industry 4.0 Technological advancement in the food and beverage manufacturing industry in South Africa—Bibliometric analysis via natural language processing. *Information*, *14*(8), 454.
3. Liang, S., Granato, D., Zou, C., Gao, Y., Zhu, Y., Zhang, L.,... & Xu, Y. Q. (2021). Processing technologies for manufacturing tea beverages: From traditional to advanced hybrid processes. *Trends in food science & technology*, *118*, 431-446.
4. Edited by Morata, A. (2021). Emerging trends in beverage processing. MDPI.
5. Edited by Aguiló-Aguayo, I., & Plaza, L. (2017). Innovative technologies in beverage processing. Wiley-Blackwell.

(FPPT-293) Beverages Processing

INSTRUCTIONAL OBJECTIVES

1. **Basics of Beverage Production**
   - **1.1** Define beverages
   - **1.2** What is the classification of beverages?
   - **1.3** What do you know about beverage industry in Pakistan?
   - **1.4** Describe the nutritional status of beverages
   - **1.5** Enlist the beverage ingredients.
   - **1.6** What are RTS and RTD in beverages?
   - **1.7** Define fruit drinks, juices, flavored drinks, sherbets, and nectars.
   - **1.8** What are the various types of coffee?
   - **1.9** What are the different types of tea?
   - **1.10** Define dietetic drinks.
   - **1.11** What is energy drink?

2. **Components for Beverage Production**
   - **2.1** What are the primary components used in beverage production?
   - **2.2** What is fruit pulp?
   - **2.3 What** are beverage concentrates?
   - **2.5** Name common acidulants used in beverages.
   - **2.6** What are sweeteners?
   - **2.7** Give examples of artificial sweeteners.
   - **2.8** Enlist common color and flavors used in beverage industry
   - **2.9** What is the function of preservatives in beverage production?
   - **2.12** What are cocoa and cocoa beans?
   - **2.13** What are stabilizers and thickeners?

3. **Beverage Manufacturing and Packaging**
   - **3.1** What are unit operations in production of beverage?
   - **3.2** Describe raw material handling and storage for beverages.
   - **3.3** What are fruit based beverages?
   - **3.4** What are carbonated beverages?
   - **3.5** What are flavored drinks?
   - **3.6** Describe low calorie beverages.
   - **3.7** Describe tea processing?
   - **3.8** Briefly describe traditional beverages
   - **3.9** What are troubles shooting in beverage industry?
   - **3.10** Enlist packaging material for beverages.

4. **Quality Control in Beverage Processing**

   - **4.1** What are the WHO standards for Drinking water?
   - **4.2** Define water Hardness?

4.3 What are TDS?
4.4 Define brix
4.5 What is acidity?
4.6 Enlist different sources of drinking Water,
4.7 What is water purification
4.8 Enlist methods of water purification systems?
4.9 What is sanitation?

(FPPT-293) Beverage Processing

List of Practical **96 Hrs.**

1. Prepare fruit juices
2. Prepare vegetable juices
3. Prepare tea
4. Prepare carbonated beverages
5. Prepare non-carbonated beverages
6. Perform Chemical analysis of beverages
7. Visit to beverage industry
8. Perform Bottling of juice
9. Determine chemical quality of water
10. Prepare Fermented beverages
11. Prepare Coffee
12. Prepare Soups
13. Prepare Lemonade
14. Prepare mint margarita
15. Prepare traditional drinks

3rd Year

نصاب سال سوئم

GEN 301

ٹی	پی	سی
1	0	1

حصہ اول اسلامیات

حصہ دوئم مطالعہ پاکستان

کل وقت 20 گھنٹے

موضوعات:

1۔ قرآن مجید:

سورۃ الفاتحہ، آیت الکرسی، سورۃ البقرہ کی آخری آیات از امن الرسول ﷺ تا آخر اور سورۃ اخلاق مع ترجمہ وتشریح

2۔ دس منتخب احادیث کا ترجمہ (تشریح)

() بنی الا سلام علی خمس شهادت انا الا اله الا لمر اقلم الصلوته و ایتا الزکوة و حج البیت و صوم رمضان

() الدین النصیحته

() المنشاء موتمن

() للمومن علی المومن سنت خصال یعود ماذا مرض و تژهده اذا مات و یحیبه اذا دعا

() لیسلم علیه اذا لقیه و لیثمته اذا عطس و فصیحله اذا غاب او شهد

() لا تخن من خانک

() لا یدخل الجنته قاتع

() ان الله حرم علیکم عقوق المهات و اضاعته المال

() لیسر اولا تعسر اولا تنفر

() ذاق طعم الایمان من مرضی بالله و با الا سلام دینابمجمدنبیا

() افضل الذکر لا اله الا الله

3۔ حقوق وفرائض:

حصول تعلیم بطور فرض، والدین اور اولاد کے حقوق وفرائض، ہمسایہ کے حقوق، بچوں کے حقوق، عورتوں کے حقوق، بزرگ شہریوں کے حقوق، مخنث افراد کے حقوق۔

4۔ اسلام کی اخلاقی اقدار:

صبر واستقلال، عفو ودرگزر، ایفائے عہد، اخوت، ایثار وقربانی۔

سال سوئم

حصہ اول اسلامیات

تدریس مقاصد

قرآن حکیم:

عمومی مقاصد: منتخب سورتوں اور آیات کی روشنی میں اسلام کے بنیادی مقاصد اور عبادات جان سکے

خصوصی مقاصد: طالب علم اس قابل ہو جائے گا کہ۔

سورۃ الفاتحہ، آیت لکرسی، سورۃ بقرہ کی آخری آیات ازمن الرسول سے اور سورۃ اخلاق کا ترجمہ وتشریح کر سکے

طالب علم درج ذیل کا مفہوم بیان کر سکے

- () رب العالمین صرف اللہ تعالیٰ ہے
- () اللہ رحم کرنے والا ہے
- () قیامت کے دن بادشاہی اللہ کی ہوگی
- () عبادات اور استعانت کا حقدار صرف اللہ ہے
- () طالب علم درج ذیل کا مفہوم بیان کر سکے
- () اللہ پاک ہر عیب سے پاک ہے
- () اللہ کے اسمائے حسنہ حق اور قیوم ہیں
- () تمام انبیاء پر ایمان لانا ضروری ہے
- () رسول، ملائکہ، کتب، سماویہ، پر ایمان لانا فرض ہے
- () اطاعت حقیقی صرف اللہ کے لیے ہے
- () اسلامی احکامات پر عمل کرنا امسانی بساط میں ہے
- () کفر کو اللہ کی مدد کے بغیر شکست نہیں دی جا سکتی
- () اللہ ایک ہے
- () اللہ کسی کا محتاج نہیں نہ اسکا کوئی شریک ہے

منتخب احادیث:

عمومی مقصد: احادیث کی روشنی میں اسلامی تعلیمات پر عمل پیرا ہو سکے

خصوصی مقاصد:

() احادیث کا ترجمہ بیان کر سکے

() احادیث کی تشریح کر سکے

() معاشرتی اور انفرادی زندگی میں احادیث سے رہنمائی حاصل کر سکے

حقوق وفرائض:

عمومی مقاصد:

() اسلامی معاشرے کا ایک اچھا فرد بن سکے

خصوصی مقاصد:

() والدین کے حقوق وفرائض بیان کر سکے

() ہمسائیوں کے حقوق بیان کر سکے

() بچوں کے حقوق بیان کر سکے

() عورتوں کے حقوق کی پاسداری کر سکے

() بزرگ شہریوں کے حقوق کا خیال رکھ سکے

() مخنث حضرات کے حقوق جان سکے اور ان کے حقوق کی پاسداری کر کے انہیں معاشرے کا ایک مفید فرد بنایا جا سکے

() اسلام میں حقوق وفرائض کی آگاہی کی صورت میں اپنے اندر خدمت خلق کا جذبہ پیدا کر سکے

اسلامی اقدار:

عمومی مقاصد:

() طالب علم جان سکے گا کہ تعلیم کا مقصد حسن اخلاق سے متصف ہونا ہے

خصوصی مقاصد:

() اخلاق کے معنی ومفہوم کو بیان کر سکے

() اسلام میں حسن واخلاق کی اہمیت بیان کر سکے

() قرآن وسنت کی روشنی میں صبر واستقلال کی اہمیت بیان کر سکے

() ایفائے عہد کی اہمیت بیان کر سکے

() اخوت کے معنی ومفہوم بیان کر سکے

() اخوت اسلامی کی اہمیت بیان کر سکے

() اسلام کی اعلیٰ اقدار کو اپنا کر مثالی معاشرہ پیدا کر سکے

نصاب (سال سوئم)

GEN 301

ٹی	پی	سی
1	0	1

کل وقت 12 گھنٹے

مطالعہ پاکستان

حصہ دوئم

موضوعات:

() قیام پاکستان

() باؤنڈری کمیشن

() ریڈکلف ایوارڈ

() تقسیم بنگال

() تقسیم پنجاب

() مسئلہ مہاجرین

() ریاست کا الحاق

() ریاست جموں کشمیر

() نہری پانی کا تنازعہ

() قرارداد پاکستان

() علماء کے بائیس نکات

() 1956-1962-اور 1973 کے دساتیر کی اسلامی/انسانی حقوق کی دفعات (8 تا 28)۔

() اقلیتوں کے حقوق۔ دیگر محروم طبقات کے حقوق

() پاکستان کا محل وقوع اور اسکی جغرافیائی اہمیت۔ GSP+ کا تعارف اور عملی طریقہ کار

() قدرتی وسائل (تیل، گیس، کوئلہ)

مطالعہ پاکستان (حصہ دوئم)

قیام پاکستان

تدریس مقاصد:

عمومی مقاصد:

() قیام پاکستان کے بعد درپیش مسائل سے آگاہی حاصل کرے اور بیان کرے

خصوصی مقاصد:

() باؤنڈری کمیشن تشکیل اور اس کے فرائض بیان کر سکے

() ریڈکلف اور اس کے ایوارڈ کے بارے بیان کر سکے

() بنگال اور کلکتہ کی تقسیم کی وجوہات بیان کر سکے

() پنجاب کی تقسیم کی تفصیل بیان کر سکے

() مہاجرین کی آمد سے جو مسائل پیدا ہوئے انہیں بیان کر سکے

() ریاستوں کے الحاق کے بارے میں تفصیل بیان کر سکے

() ریاست جموں کشمیر کے بارے میں بیان کر سکے

() نہری پانی کے تنازعہ کو بیان کر سکے

() قرارداد مقاصد کی تفصیلات بیان کر سکے

() 22 علماء کے متفقہ اسلامی نکات بیان کر سکے

() 1973 کے آئین میں انسانی حقوق کی دفعات (8-28)۔اقلیتوں کے حقوق اور دیگر محروم طبقات کے حقوق کے بارے میں جان سکے

() قیام پاکستان کے بعد نفاذ اسلام کی کوششوں کو بیان کر سکے

() پاکستان کے محل وقوع اور اس کی جغرافیائی اہمیت بیان کر سکے اور GSP+ کے تعارف اور عملی طریقہ کار بیان کر سکے

() پاکستان میں قدرتی وسائل (تیل، گیس، کوئلہ) کے بارے میں بیان کر سکے

خصوصی مقاصد:

() احادیث کا ترجمہ بیان کر سکے

() احادیث کی تشریح کر سکے

() معاشرتی اور انفرادی زندگی میں احادیث سے رہنمائی حاصل کر سکے

حقوق وفرائض:

عمومی مقاصد:

() اسلامی معاشرے کا ایک اچھا فرد بن سکے

خصوصی مقاصد:

() والدین کے حقوق وفرائض بیان کر سکے

() ہمسائیوں کے حقوق بیان کر سکے

() بچوں کے حقوق بیان کر سکے

() عورتوں کے حقوق کی پاسداری کر سکے

() بزرگ شہریوں کے حقوق کا خیال رکھ سکے

() مخنث حضرات کے حقوق جان سکے اور ان کے حقوق کی پاسداری کر کے انہیں معاشرے کا ایک مفید فرد بنایا جا سکے

() اسلام میں حقوق وفرائض کی آگاہی کی صورت میں اپنے اندر خدمت خلق کا جذبہ پیدا کر سکے

اسلامی اقدار:

عمومی مقاصد:

() طالب علم جان سکے گا کہ تعلیم کا مقصد حسن اخلاق سے متصف ہونا ہے

خصوصی مقاصد:

() اخلاق کے معنی ومفہوم کو بیان کر سکے

() اسلام میں حسن واخلاق کی اہمیت بیان کر سکے

() قرآن وسنت کی روشنی میں صبر واستقلال کی اہمیت بیان کر سکے

() ایفائے عہد کی اہمیت بیان کر سکے

() اخوت کے معنی ومفہوم بیان کر سکے

() اخوت اسلامی کی اہمیت بیان کر سکے

() اسلام کی اعلیٰ اقدار کو اپنا کر مثالی معاشرہ پیدا کر سکے

نصاب (سال سوئم)

GEN 301

ٹی	پی	سی
1	0	1

کل وقت 12 گھنٹے

مطالعہ پاکستان

حصہ دوئم

موضوعات:

() قیام پاکستان

() باؤنڈری کمیشن

() ریڈکلف ایوارڈ

() تقسیم بنگال

() تقسیم پنجاب

() مسئلہ مہاجرین

() ریاست کا الحاق

() ریاست جموں کشمیر

() نہری پانی کا تنازعہ

() قرارداد پاکستان

() علماء کے بائیس نکات

() 1956-1962-اور 1973 کے دساتیر کی اسلامی/انسانی حقوق کی دفعات (8 تا 28)۔

() اقلیتوں کے حقوق۔ دیگر محروم طبقات کے حقوق

() پاکستان کا محل وقوع اور اسکی جغرافیائی اہمیت۔ GSP+ کا تعارف اور عملی طریقہ کار

() قدرتی وسائل (تیل، گیس، کوئلہ)

غیر مسلم طلباء کے لیے

نصاب اخلاقیات (سال سوئم)

تدریس مقاصد:

عمومی مقاصد:

() ملکی ترقی کے لیے اعلیٰ اوصاف کے ساتھ بہتر طور پر ملک وملت کی خدمت کر سکے

خصوصی مقاصد: طالب علم اس قابل ہو سکے کہ

() موضوعات کا مطلب بیان کر سکے

() عملی زندگی سے مثالوں کی نشاندہی کر سکے

() موضوعات کی اہمیت بیان کر سکے

() اپنی شخصیت اور معاشرے پر موضوعات کے مطابق اثرات پیدا کرنے کے طریقے بیان کر سکے

() مثبت ذہن کے ساتھ کام کر سکے

() عدل وانصاف سے ادارہ میں، دفتر میں بہتر ماحول پیدا کر سکے

() ماحول کو اخلاقی طور پر پاکیزہ بنائے

() کارکنوں کی بہتر طور پر دل جوئی کر سکے

() کارکردگی میں اضافہ کر سکے

() باہمی احترام کی برکات سے استفادہ کر سکے

() بچوں کے حقوق بیان کر سکے

() عورتوں کے حقوق کی پاسداری کر سکے

() بزرگ شہریوں کے حقوق کا خیال رکھ سکے

() مخنث حضرات کے حقوق جان سکے اور ان کے حقوق کی پاسداری کر کے انہیں معاشرے کا ایک مفید فرد بنایا جا سکے

MGM-321 BUSINESS COMMUNICATION

T	P	C
1	0	1

Total contact hours

Theory 32 Hrs.

Prerequisites: The students shall already be familiar with the language concerned.

AIMS: The course has been designed to enable the students for:

1. Development of communication skills.
2. Understanding basic principles of good and effective business letter writing in commercial and industrial fields.
3. Develop knowledge and skill to write technical report with confidence and accuracy.

COURSE CONTENTS

1. COMMUNICATION PROCESS. 6 Hours

1.1 Purposes of communication
1.2 Communication process
1.3 Distortions in communication
1.4 Consolidation of communique
1.5 Communication flow
1.6 Communication for self development

2. ORAL COMMUNICATION SKILLS. 6 Hours

2.1 Significance of speaking.
2.2 Verbal and non-verbal messages.
2.3 Strategic steps of speaking.
2.4 Characteristics of effective oral messages.
2.5 Communication Trafficking.
2.6 Oral presentation.

3. QUESTIONING SKILLS. 3 Hours

3.1 Nature of question.
3.2 Types of questions.
3.3 Characteristics of a good question.
3.4 Questioning strategy

4. LISTENING SKILLS. 5 Hours

4.1 Principles of active listening.
4.2 Skills of active listening.
4.3 Barriers to listening.
4.4 Reasons of poor listening.
4.5 Giving Feedback.

5. INTERVIEWING SKILLS. 3 Hours

5.1 Significance of interviews.
5.2 Characteristics of interviews.
5.3 Activities in an interviewing situation
5.4 Types of interviews.
5.5 Interviewing strategy.

6. REPORT WRITING. 3 Hours

6.1 Goals of report writing
6.2 Report format.
6.3 Types of reports.
6.4 Report writing strategy.

7. READING COMPREHENSION. 2 Hours

7.1 Reading problems.
7.2 Four Reading skills.

8. GROUP COMMUNICATION. 4 Hours

8.1 Purposes of conducting meetings.
8.2 Planning a meeting.
8.3 Types of meetings.
8.4 Selection of a group for meeting.
8.5 Group leadership skills.
8.6 Running a successful meeting.
8.7 Active participation techniques.

RECOMMENDED BOOKS

1. Sh. Ata-ur-Rehman Effective Business Communication & Report Writing.
2. Ulman J.N. Could JR. Technical Reporting.

MGM-321 BUSINESS COMMUNICATION.

INSTRUCTIONAL OBJECTIVES

1. **UNDERSTAND THE COMMUNICATION PROCESS.**
   - 1.1 Explain basic terminology of business communication
   - 1.2 State the benefits of two way communication.
   - 1.3 Describe a model of communication process.
   - 1.4 Explain the major communication methods used in organization.
   - 1.5 Identify the barriers to communication and methods of overcoming these barriers.
   - 1.6 Identify misconceptions about communication.

2. **UNDERSTAND THE PROCESS OF ORAL.**
   - 2.1 Identify speaking situations with other peoples.
   - 2.2 Identify the strategy steps of speaking.
   - 2.3 Identify the characteristics of effective speaking.
   - 2.4 State the principles of one-way communication.
   - 2.5 State the principles of two-way communication.
   - 2.6 Identify the elements of oral presentation skills.
   - 2.7 Determine the impact of non-verbal communication on oral communication.
   - 2.8 Letters writing skill.

3. DETERMINE THE USES OF QUESTIONING SKILLS TO GATHER AND CLARIFY INFORMATION IN THE ORAL COMMUNICATION PROCESS.
   - 3.1 Identify different types of questions.
   - 3.2 Determine the purpose of each type of question and its application.
   - 3.3 Identify the hazards to be avoided when asking questions.
   - 3.4 Demonstrate questioning skills.

4. DEMONSTRATE THE USE OF ACTIVE LISTENING SKILL IN THE ORAL COMMUNICATION PROCESS.
   - 4.1 State the principles of active listening.
   - 4.2 Identify skills of active listening.
   - 4.3 Identify barriers to active listening.
   - 4.4 State the benefits of active listening.
   - 4.5 Demonstrate listening skills.
   - 4.6 Explain the importance of giving and receiving feed back.

5. DETERMINE THE APPROPRIATE INTERVIEW TYPE FOR THE SPECIFIC WORK-RELATED SITUATION AND CONDUCT A WORK-RELATED INTERVIEW.
   - 5.1 State the significance of interviews.
   - 5.2 State the characteristics of interviews.
   - 5.3 Explain the activities in an interviewing situation.
   - 5.4 Describe the types of interviews.
   - 5.5 Explain the interviewing strategy.
   - 5.6 Prepare instrument for a structured interview.

6. PREPARE A REPORT OUT-LINE, BASED ON SUBJECT MATTER AND AUDIENCE.
   - 6.1 Identify the different types of reports.
   - 6.2 Determine when to use an informal or formal report presentation.

6.3 Identify the stages of planning a report.
6.4 Identify the parts of a report and choose the parts appropriate for each type of report.
6.5 Draft a report outline.

7. DEMONSTRATE READING COMPREHENSION.

7.1 Identify major reading problems.
7.2 Identify basic reading skills.
7.3 State methods of previewing written material.
7.4 Identify methods of concentration when reading.
7.5 Demonstrate reading comprehension.

8. UNDERSTAND THE PRINCIPLES OF GROUP COMMUNICATIONS.

8.1 State the purpose and characteristics of major types of meeting.
8.2 Explain responsibilities of a meeting/committee.
8.3 Identify problems likely to be faced at meeting and means to overcome these problems.
8.4 Distinguish between content and process at meetings.
8.5 Explain the key characteristics of a good group facilitator.
8.6 Writing skill of minutes of meeting.

(MGM-301) Digital Marketing

Total Contact Hours				
Theory	**32**	**T**	**P**	**C**
Practical		**1**	**0**	**1**

Learning objectives: The student will be able to develop and implement effective digital marketing strategies across various online platforms and apply social media marketing techniques to increase brand visibility and engagement.

Course Contents

1. Introduction **2 hours**

1.1. Marketing
1.2. Digital marketing
1.3. Social Media Marketing
1.4 Social media marketing vs traditional marketing
1.5. Need of social media marketing
1.6 competitions ANALYSIS

2. Social Media Marketing (SMM) **06hours**

2.1 Introduction to social media platforms (Facebook, Twitter, Instagram, etc.)
2.2 Creating social media content (text, images, and videos)
2.3. Social media advertising (Facebook Ads, Twitter Ads)
2.4. Social media engagement and community management
2.5. Social media analytics and metrics

3. Search Engine Optimization (SEO) **04 hours**

3.1 Introduction to SEO and Its Importance
3.2 How Search Engines Work
3.3 Keyword Research and Tools
3.4 On-Page SEO Techniques (Titles, Meta Descriptions, Tags, etc.)
3.5 Off-Page SEO Techniques (Backlinks, Social Signals)
3.6 Technical SEO (Site Speed, Mobile Optimization)
3.7 SEO Tools and Analytics (Google Search Console, SEMrush)

4. Search Engine Marketing (SEM) & Pay-Per-Click (PPC) **04 hours**

4.1 Introduction to SEM and Paid Search Advertising
4.2 Google Ads Overview
4.3 Setting Up and Managing Google Ads Campaigns
4.4 Bidding Strategies and Budgeting
4.5 Creating Effective Ad Copy and Landing Pages
4.6 Tracking PPC Campaigns and Performance Analysis
4.7 Conversion Tracking and Return on Investment (ROI)

5. Mobile Marketing **6 hours**

5.1 Knowledge of mobile marketing
5.2 Understanding of Mobile Marketing Types
5.3 Knowledge of mobile marketing platforms and tools
5.4 Understanding of mobile marketing formats and standards
5.5 Techniques to configure different mobile marketing apps

6. Ethical Considerations & Legal Aspects of Digital Marketing **2 hours**

6.1 Ethical digital marketing.
6.2 Data Privacy Laws: GDPR, CCPA
6.3 Social Media Guidelines and Legal Compliance
6.1 Best Practices for Digital Advertising Ethics

Books Recommended:

1. Benvenuti, N. Z. (2024). The best digital marketing book: Take your marketing to the next level – 2024 edition. Lioncrest Publishing.
2. Connors, K. (2024). Digital marketing 2024: Mastering AI, SEO, social media, and data-driven strategies for business growth. Independently Published.
3. Chaffey, D., & Ellis-Chadwick, F. (2024). Digital marketing: Strategy, implementation & practice . Pearson.
4. Pulizzi, J. (2024). Epic content marketing: How to tell a different story, break through the clutter, and win more customers by marketing less. McGraw-Hill Education.

(MGM-301) Digital Marketing

INSTRUCTIONAL OBJECTIVES

1 Introduction

1.1 Define Digital Marketing
1.2 What is the importance of digital marketing?
1.4 enlist Types of digital marketing

2 Social Media Marketing (SMM)

2.1 Define Social Media Marketing (SMM) and explain its importance
2.2 Enlist different social media platforms that serve various marketing goals.

3. Search Engine Optimization (SEO)

3.1 Define SEO and explain its importance in driving organic traffic to websites.
3.2 What is the role of algorithms in ranking content?
3.3 Enlist different keyword research tools to identify high-ranking keywords?
3.5 Identify and fix technical SEO issues related to site speed.
3.7 What ae the tools to track SEO performance.
3.8 What is the Use of social media analytics tools to track the performance of social media campaigns?

4. Search Engine Marketing (SEM) & Pay-Per-Click (PPC)

4.1 Define Search Engine Marketing (SEM)
4.2 Differentiate between SEM and SEO
4.3 Identify and select the best-performing keywords for PPC campaigns?

5. Mobile Marketing

4.1 Define mobile marketing and explain its role in reaching and engaging users on mobile devices.
4.2 What are different Techniques to configure different mobile marketing apps

6. **Ethical Considerations & Legal Aspects of Digital Marketing**

6.1 Define ethical digital marketing and explain its significance.
6.2 What is GDPR
6.3 Define CCPA
6.4 Enlist Social Media Guidelines
6.5 What are the Best Practices for Digital Advertising Ethics

(FPPT-313) **MEAT, POULTRY & SEA FOOD PROCESSING**

Total Contact Hours

Theory	64	T	P	C
Practical	96	2	3	3

Learning Outcomes: The students will be able to understand the composition, structure, and functional properties of meat, poultry, and seafood, and their impact on quality and processing. They will also earn various processing, preservation, and packaging techniques to enhance safety, shelf life, and product value.

Course Contents

1. Introduction **08 hours**

- **1.1.** Red meat and white meat
- **1.2.** Nutritional Composition of meat
- **1.3.** Source of meat
- **1.4.** Meat alternative
- **1.5.** Culture meat
- **1.6.** Halal & Haram meat

2. Meat processing **12 hours**

- **2.1.** Halal slaughtering, cutting and dressing of animals
- **2.2.** Postmortem changes
- **2.3.** Canning,
- **2.4.** Freezing
- **2.5.** Smoking
- **2.6.** Curing
- **2.7.** Dry aging
- **2.8.** Irradiations

3. Meat products **12 hours**

- **3.1.** Stuffed meat
- **3.2.** Restructured meat products
- **3.3.** Extruded meat
- **3.4.** Alternate meat products
- **3.5.** Quality parameters of meat
- **3.6.** Meat & Meat products Spoilage and its control

4. Poultry Meat Processing **12 hours**

- **4.1.** Classes of poultry meat
- **4.2.** Methods of slaughtering and dressing

4.3. Post slaughter handling
4.4. Processing poultry products
4.5. Stuffed poultry meat products
4.6. Storage and preservation of poultry

5. Egg Processing **10 hours**
5.1. Egg Composition
5.2. Types of eggs
5.3. Egg quality parameters
5.4. Handling of eggs
5.5. Egg processing
5.6. Quality of eggs products
5.7. Packaging and storage

6. Seafood **10 hours**
6.1. Classification of seafood
6.2. Quality Criteria for freshness of seafood
6.3. Fish processing
6.4. Spoilage and its control
6.5. Seafood industry in Pakistan

Recommended Books.

1. Breidenstein, B. C., Kinsman, D. M., & Kotula, A. W. (2013). *Muscle foods: Meat poultry and seafood technology*. Springer Science & Business Media.
2. Kerry, J. P. (Ed.). (2012). Advances in meat, poultry and seafood packaging.
3. Edited by Owens, C. M., Alvarado, C. Z., & Sams, A. R. (2010). Poultry meat processing CRC Press.
4. Edited by Hui, Y. H. (2012). Handbook of meat and meat processing . CRC Press.
5. Edited by Nollet, L. M. L. (2012). Handbook of meat, poultry and seafood quality Wiley-Blackwell.

(FPPT-313) MEAT, POULTRY & SEAFOOD PROCESSING

INSTRUCTIONAL OBJECTIVES:

1. **Introduction**
   - **1.1.** Differentiate between Red meat and white meat
   - **1.2.** Give the Nutritional Composition of meat
   - **1.3.** What are the Sources of meat
   - **1.4.** What are meat alternative ?
   - **1.5.** Define Culture meat
   - **1.6.** What is Halal & Haram meat

2. **Meat processing**
   - **2.1.** What is Halal slaughtering,?
   - **2.2.** What types of Postmortem changes take place?
   - **2.3.** Describe meat Canning.
   - **2.4.** What is Smoking?
   - **2.5.** Define curing
   - **2.6.** What is Dry aging?

3. **Meat products**
   - **3.1.** What is Stuffed meat?
   - **3.2.** What are Restructured meat products?
   - **3.3.** What is Extruded meat?
   - **3.4.** Enlist Alternate meat products
   - **3.5.** Describe Meat spoilage and its control

4. **Poultry Meat Processing**
   - **4.1.** Enlist Classes of poultry meat
   - **4.2.** Describe slaughtering and dressing of poultry birds.
   - **4.3.** What is Post slaughter handling?
   - **4.4.** What is processing poultry products?
   - **4.5.** Enlist Stuffed poultry meat products
   - **4.6.** Describe Storage and preservation of poultry

5. **EGG PROCESSING**
   - **5.1.** Describe composition and nutritive value of egg?
   - **5.2.** Give functional properties of egg proteins?
   - **5.3.** Explain candling, washing and coating of eggs?
   - **5.4.** What are modified eggs?
   - **5.5.** Describe liquid egg processing?
   - **5.6.** What is drying of egg?
   - **5.7.** Enlist quality characters of eggs products?

5.8. Describe the packaging and storage of eggs?

6. SEAFOODS

6.7. Define sea foods?

6.8. Describe classification of sea foods?

6.9. Differentiate between fresh water fish and marine fish?

6.10. What is scope of sea food industry in Pakistan?

6.11. Define Halal seafood?

6.12. Give criteria for freshness of fish?

6.13. Describe fish processing operations?

6.14. How sea foods are spoiled? Write control measures to preserve sea foods?

(FPPT-313) MEAT, POULTRY & SEAFOOD PROCESSING

List of Practical **96 Hrs.**

1 Determine freshness in meat
2 Determine freshness in fish
3 Determine egg freshness
4 Prepare sausages
5 Prepare meat balls
6 Perform canning of meat
7 Perform dry aging of meat
8 Prepare beef steaks
9 Prepare chicken steaks
10 Prepare chicken fries
11 Prepare chicken nuggets
12 Prepare stuffed chicken
13 Perform thawing of poultry meat
14 Prepare soups
15 Perform freezing of fish
16 Prepare finger fish & grilled fish
17 Perform coating of egg
18 Perform poaching of egg
19 Perform quality testing of egg and egg products
20 Visit to a slaughter house

(FPPT-322) OIL AND FAT PROCESSING

Total Contact Hours:

	T	P	C
Theory: 32			
Practical: 96	1	3	2

Learning Outcomes: The students will be able to understand the chemical composition, functional properties, and nutritional aspects of oils and fats used in food processing. They will also Learn various extraction, refining, and modification techniques to improve the quality and stability of oils and fats.

Course Contents

1. **Introduction** 04 hours
   - **1.1.** Lipids
   - **1.2.** Fat
   - **1.3.** Oil
   - **1.4.** Essential oils
   - **1.5.** Sources and uses oil & fat

2. **Extraction of oil** **08** hours
   - **2.1** Methods of extraction
   - **2.2** Storage
   - **2.3** Quality control parameters

3. **Fat rendering** **04 hours**
   - **3.1** Methods of extraction
   - **3.2** Uses of rendered fats
   - **3.3** Storage
   - **3.4** Quality control parameters

4. **Oil & vegetable ghee processing** **10 hours**
   - **4.1** Refining
   - **4.2**. Production of cooking oil
   - **4.3** Production of vegetable ghee
   - **4.4** Quality control parameters

5. **Fat and Oil based Products** **04 hours**
   - **5.1** Mayonnaise
   - **5.2** Frying oil
   - **5.3**. Salad oil
   - **5.4** Margarine
   - **5.5** Analogue products

6. **Control of Spoilage in Fats and Oil** 02 hours

6.1. Rancidity

6.2. Polymerization in fats and oils

Recommended Books

1. Y.H. Hui, 1996.Bailey's Industrial Oils and Fat Products, Vol.1-5. John Wiley and Sons Inc., New York
2. R.D. O'Brien, 2000. Fats and Oils Formulating and Processing for Application, CRC Press, London.
3. AOAC, 2005. Official Methods of Analysis. Association of Official Analytical Chemists, Arlington.
4. O'Brien, R. D. (2008). Fats and oils: Formulating and processing for applications CRC Press.
5. Edited by Lee, Y.-Y., Tang, T.-K., Phuah, E.-T., & Lai, O.-M. (2022). recent advances in edible fats and oils technology: Processing, health implications, economic and environmental impact. Springer.

(FPPT-322) OIL AND FAT PROCESSING

INSTRUCTIONAL OBJECTIVES

Course Contents

1. **Introduction**
   - **1.1** What are lipids?
   - **1.2** What are oils and fats chemically composed of?
   - **1.3** Name common sources of oils.
   - **1.4** How rancidity occurs in fats?
   - **1.5** Define essential oils.
2. **Extraction of oil**
   - **2.1** What are the methods of extraction of oil?
   - **2.2** What is the difference between cold pressing and hot pressing?
   - **2.3** What is the purpose of refining in the oil extraction process?
   - **2.4** Describe quality control parameters.
3. **Fat Rendering**
   - **3.1** What is fat rendering?
   - **3.2** Enlist source of fat used in rendering.
   - **3.3** What is the difference between wet and dry rendering?
   - **3.4** What are the uses of rendered fats?
   - **3.5** Explain storage of fats.
4. **Oil & vegetable ghee processing**
   - **4.1** What is refining process?
   - **4.3** What is vegetable ghee?
   - **4.4 What** is the main difference between oil and vegetable ghee?
   - **4.4** Describe the production of vegetable ghee.
   - **4.5** How is crystallization achieved in ghee production?

5 Fat and oil based Products

- **5.1** What is mayonnaise?
- **5.2** What role do fats play in making confectionery items like chocolate?
- **5.3** What is shortening, and how is it used in baking?
- **5.4** What is salad oil?
- **5.5** What is Margarine?
- **5.6** What are Fat Analogue products?

6 Spoilage Control in Fats and Oil

- 6.1.What is rancidity?
- 6.2.How rancidity can be prevented?
- 6.3.How do packaging materials help in controlling spoilage in fats and oils?
- 6.4.What is the role of antioxidants in controlling spoilage of oils?
- 6.5.What is polymerization in fats and oils?

(FPPT-322) OIL AND FAT PROCESSING

List of Practical **96 Hrs.**

1. Determine moisture content.
2. Extract oil from selected Plants seeds
3. Perform Rendering of fats from animal sources
4. Determine refractive index of oil
5. Measure color of oil
6. Determine melting point of ghee
7. Determine melting point of butter
8. Determine the specific gravity
9. Determine the peroxide value of oil
10. Determine the saponification value of oil
11. Determine the iodine value of oil
12. Determine the Acid value/FFA
13. Prepare mayonnaise
14. Determine the quality of frying oils (Smoke point & Flash points)
15. Prepare margarine
16. Prepare salad oil
17. Visit to fat and oil processing industry

(FPPT-342) FOOD PACKAGING

Total Contact Hours

		T	P	C
Theory	**32**			
Practical	**96**	**1**	**3**	**2**

Learning Outcomes: The student will be able to understand the principles, materials, and technologies used in food packaging to maintain product quality and safety. They will also learn about innovative and sustainable packaging solutions, including their impact on the environment and consumer preferences.

Course Contents

1. Introduction **6 hours**
- **1.1.** Packaging
- **1.2.** Reasons for packaging
- **1.3.** Level of packaging
- **1.4.** Sustainable packaging

2. Functions of Packaging **6 hours**
- **2.1.** Containment
- **2.2.** Protection
- **2.3.** Transportation
- **2.4.** Identification & traceability
- **2.5.** Nature of product

3. Packaging Techniques **12 hours**
- **3.1.** Conventional
- **3.2.** Modern
- **3.3.** Aseptic packaging
- **3.4.** Edible packaging
- **3.5.** Active packaging
- **3.6.** Intelligent packaging
- **3.7.** Sensor based packaging
- **3.8.** Lamination and coating technology
- **3.9.** Retort able packaging
- **3.10.** Gas exchange packaging
- **3.11.** Vacuum packaging

4. Packaging Materials **8 hours**
- **4.1.** Plastic
- **4.2.** Glass
- **4.3.** Metal
- **4.4.** Paper and Paperboard

4.5. Biodegradable and Compostable Materials
4.6. Aluminum Foil
4.7. Flexible Packaging (Laminates)
4.8. Biopolymers
4.9. Foam Packaging
4.10. Recycling of packaging material

Recommended Books

1. Edited by Chiellini, E. (2022). Food packaging: Materials and technologies. Springer.
2. Murcott, A. (2023). The (not so) secret lives of food packaging. Bloomsbury Publishing.
3. Robertson, G. L. (2022). Food packaging: Principles and practice . CRC Press.
4. Moyer, A., & Berwick, M. (2022). Food packaging technology (2nd ed.). Wiley-Blackwell.
5. Chiellini, E. (2022). Food packaging: Materials and technologies. Springer.

(FPPT-342) FOOD PACKAGING

INSTRUCTIONAL OBJECTIVES*

1. **Introduction**
   - **1.1.** Define packaging.
   - **1.2.** Enlist types of packaging material.
   - **1.3.** How does food packaging help in preserving food?
   - **1.4.** What is the primary purpose of food packaging?
   - **1.5.** Describe the levels of packaging.
   - **1.6.** What is sustainable packaging?

2. **Functions of Packaging**
   - **2.1.** What do you know about containment?
   - **2.2.** How does packaging extend the shelf life of products?
   - **2.3.** What is the function protection?
   - **2.4.** Why is transportation a key function of packaging?
   - **2.5.** What are the factors that affect the transportation?
   - **2.6.** Describe identification & traceability.

3. **Packaging Techniques**
   - **3.1.** What is the difference between conventional and modern packaging?
   - **3.2.** What is aseptic packaging?
   - **3.3.** What is active packaging?
   - **3.4.** What is the purpose of intelligent packaging?
   - **3.5.** How does Modified Atmosphere Packaging (MAP) work?
   - **3.6.** What do you know about sensor-based packaging?
   - **3.7.** What is the purpose behind lamination and coating technology?
   - **3.8.** Describe gas exchange packaging.
   - **3.9.** What do you about vacuum packaging?

4. **Packaging Materials**
   - **4.1.** What are plastics?
   - **4.2.** What are the benefits of glass?
   - **4.3.** Name two common materials used in food packaging.
   - **4.4.** What is a biodegradable packaging material?
   - **4.5.** What are the benefits of biodegradable and compostable materials?
   - **4.6.** What is the use of aluminum foil?
   - **4.7.** What is the purpose of Flexible Packaging (Laminates)?
   - **4.8.** What are biopolymers?
   - **4.9.** Define foam Packaging.
   - **4.10.** What is process of recycling of packaging material?

(FPPT-342) FOOD PACKAGING

List of Practical **96 Hours**

1. Determine moisture in packaging materials
2. Perform Compression test of packaging materials
3. Perform Measurement of packaging materials
4. Perform Seal Strength test of packaging materials
5. Identify packaging materials
6. Select packaging materials for seasonal of fruits & vegetables
7. Select Packaging materials for Liquids foods
8. Perform Grammage test
9. Perform Thickness test
10. Perform Photo cell inspection of packaging material
11. Perform Inspection of label requirement

(FPPT-351) FOOD SAFETY & QUALITY MANAGEMENT

Total Contact Hours:

	T	P	C
Theory: 3 2			
Practical: 0	1	0	1

Learning Outcomes: The students will be able to Understand the principles of food safety and quality management systems, including Hazard Analysis Critical Control Point (HACCP) and Good Manufacturing Practices (GMP). The students will also learn about regulatory frameworks and standards that ensure food safety and quality throughout the production and distribution processes.

Course Contents

1. **Introduction** **6 Hrs.**
   - 1.1. Quality, quality control and quality assurance
   - 1.2. Physical, Chemical, microbial quality parameters
   - 1.3. Sanitation and hygiene
2. **Food Safety and Quality Standards** **12 Hrs.**
   - 2.1. Total Quality Management
   - 2.2. ISO-9000 Series Standard in Food Industry
   - 2.3. FSSC 22000, Halal, Punjab pure food rules, Pakistan standards, PRP (GAP, GLP, GMP), OPRP(HACCP) and their parameters
3. **Sensory Evaluation** **02 Hrs**
   - 3.1. Principles of sensory evaluation
   - 3.2. Purpose of panelists
4. **Food Safety** **12 Hrs.**
   - 4.1. Food Safety
   - 4.2. Food hazards and Food Contamination
   - 4.3. Food Safety issues
   - 4.4. Food borne illness
   - 4.5. Food traceability and Product Recall
   - 4.6. Food Safety audit & checklist
   - 4.7. Auditing in food industry
   - 4.8. Pest control management

Recommended Books

1. Augusto, M. (2022). Food safety and quality management: A comprehensive approach. Wiley.
2. Fellows, P. (2021). Food processing technology: Principles and practice . Woodhead Publishing.
3. Frazier, W. C., & Westhoff, D. C. (2020). Food microbiology McGraw-Hill Education.
4. Jongen, W. M. F. (2022). Food quality management: A comprehensive approach . Springer.
5. Sainty, G. L. (2022). Food safety management: A practical guide for the food industry. Springer.

(FPPT-351) FOOD SAFETY & QUALITY MANAGEMENT

INSTRUCTIONAL OBJECTIVES:

1. **Introduction**
   - **1.1** What do you mean by food quality?
   - **1.2** What is difference between quality control and quality assurance?
   - **1.3** What are Physical, Chemical, microbial quality parameters?
   - **1.4** Explain principles of quality management
2. **Food Safety Quality Standards**
   - 1.1. What is Total Quality Management system?
   - 1.2. Describe the ISO-9000 Series Standard in Food Industry
   - 1.3. What is FSSC 22000, ?
   - 1.4. What is Halal & haram?
   - 1.5. What are Punjab pure food rules,
   - 1.6. What is the role of PSQCA?
   - 1.7. Briefly describe GAP, GLP and GMP
   - 1.8. Enlist the principles of HACCP
   - 1.9. What is GFSI and its Importance?
   - 1.10. What is BRC and its Importance?
3. **Sensory Evaluation**
   - **3.1.** Define Sensory Evaluation?
   - 3.2. What are the modern methods for the sensory evaluation?
   - 3.2 What is the criteria sensory penal list?
4. **Food Safety**
   - **6.1** Define Food Safety
   - **6.2** What are Food hazards?
   - **6.3** What is the difference between food contamination and cross contamination
   - **6.4** Enlist Food Safety issues
   - **6.5** What is Food borne illness
   - **6.6** What is the Food traceability and Product Recall?
   - **6.7** What is audit?
   - **6.8** What is IPM?

(FPPT-361) FOOD WASTE MANAGEMENT

Total Contact Hours				
Theory	**32**	**T**	**P**	**C**
Practical	**0**	**1**	**0**	**1**

Learning Outcomes: The student will be able to understand the causes and types of food waste at different stages of the food supply chain. They will also learn strategies and technologies for reducing, recycling, and managing industrial food.

1. **Introduction** **04 hours**
   - **1.1.** Food Waste
   - **1.2.** Food Loss
   - **1.3.** Source of food waste
   - **1.4.** Global and local statistics of Food Waste
   - **1.5.** Environmental, Social, and Economic Impacts of Food Waste.
2. **Causes Food Waste** **06hours**
   - **2.1.** Primary Causes of Food Waste
   - **2.2.** Food Waste along the Supply Chain
   - **2.3.** Consumer behavior
   - **2.4.** Economic factors
   - **2.5.** Social Factors
3. **Food Waste Reduction Strategies** **08 hours**
   - **3.1.** Source Reduction and Prevention Techniques.
   - **3.2.** Food Recovery and Redistribution Programs.
   - **3.3.** Donation and Food Bank Initiatives.
   - **3.4.** Surplus Food Redistribution Platforms
   - **3.5.** Consumer education
   - **3.6.** Supply chain optimization
   - **3.7.** Circular economy approaches
4. **Food Waste Recycling and Recovery techniques** **08 hours**
   - **4.1.** Biological techniques
   - **4.2.** Thermal techniques
   - **4.3.** Chemical techniques
   - **4.4.** Physical techniques
   - **4.5.** Hybrid techniques
   - **4.6.** Recovery of Valuable Resources from Food Waste.

5. Food Waste Management Regulations and Policies. **06 hours**

5.1. National and International Policies on Food Waste Reduction

5.2. Government Initiatives and Programs.

5.3. Role of Environmental Protection Agency (EPA)

Note: Industrial Visits to WASA is recommended for the better understanding

Recommended Books:

1. Gustavsson, J., Cederberg, C., & Sonesson, U. (2011). Global food losses and food waste: Extent, causes, and prevention. Food and Agriculture Organization of the United Nations (FAO).
2. Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: Quantification and potential for change to 2050. Springer.
3. Stefan, V., van Herpen, E., & Tudoran, A. (2013). Food waste management: From food surplus to resource recovery. Springer.
4. Khan, A. M., & Mohsin, S. (2022). Sustainable food waste management: Challenges and opportunities. Elsevier.
5. Verghese, K., & Lewis, H. (2022). Food waste: Minimization and management for sustainable food systems. CRC Press.

(FPPT-361) FOOD WASTE MANAGEMENT

INSTRUCTIONAL OBJECTIVES
On completion of this course, the students will be able to: -

1. **Introduction**
   - **1.1.** Define food waste and food loss
   - **1.2.** Enlist the types of food waste
   - **1.3.** Describe the source of food waste
   - **1.4.** Describe the global and local statistics of food waste
   - **1.5.** Describe the environmental, social, and economic impacts of food waste.

2. **Causes Food Waste**
   - **2.1.** Describe the primary causes of food waste
   - **2.2.** Describe the food waste along the supply chain
   - **2.3.** Describe the consumer behavior for food waste
   - **2.4.** Describe the economic factors of food waste
   - **2.5.** Describe the social factors of food waste

3. **Food Waste Reduction Strategies**
   - **3.1.** Enlist the food waste reduction strategies
   - **3.2.** Describe the source reduction at source point.
   - **3.3.** What are the donation and food bank initiatives?
   - **3.4.** Describe the circular economy approaches for food waste reduction?

4. **Food Waste Recycling & Recovery Techniques**
   - **4.1.** What are the biological techniques used for food waste recycling
   - **4.2.** Enlist the thermal techniques used for food waste recycling
   - **4.3.** What are the chemical techniques used for food waste recycling
   - **4.4.** Name techniques used for the recovery of valuable resources from food waste

5. **Food Waste Management Regulations & Policies.**
   - **5.1.** What are the national and international policies on food waste reduction
   - **5.2.** Describe the role of government initiatives and programs in food waste reduction.
   - **5.3.** Describe the role of Environmental Protection Agency (EPA)

(FPPT 371) FOOD LAWS AND REGULATIONS

Total Contact Hours

		T	P	C
Theory	32			
Practical	0	1	0	1

Learning Outcomes: The students will be able to understand the key food safety laws, regulations, and standards governing food production, labeling, and distribution. They will also learn about the roles of regulatory agencies, such as the PFA and PSQCA, in ensuring food safety and consumer protection.

Course Contents

1. Introduction **4 Hours**

1.1. Structure of Food laws and regulations **of P**akistan

1.2. Pure Food Ordinance 1960 (Brief Introduction)

1.3. Cantonment Pure Food Ordinance 1966

2. Punjab Food Authority Acts **8 Hours**

2.1. Definitions

2.2. Powers & Functions of Punjab Food Authority

2.3. Procedure of licensing from Punjab food authority

2.4. Enforcement mechanism

2.5 Standards of water, mix milk and cooking oil

2.6 Banned food additives

2.7 Food labeling requirements

3. Islamic Food Laws in Pakistan **6 Hours**

3.1. Status of food (Halal, Haram, Mashbooh and Makroh)

3.2 Unlawful foods and ingredients

3.3. Functions of Pakistan Halal Authority

3.4. Enforcement mechanism of Pakistan Halal Authority

3.5 Punjab Halal Development Agency Act 2016 (Functions)

4. Pakistan Hotel & Restaurants Act **4 Hours**

4.1. Definitions

4.2. Classification of Hotels (starring)

4.3. Powers of Controller under Pakistan Hotel & Restaurants Act 1970

5. Pakistan Standards and Quality Control Authority **4 Hours**

5.1. Functions and Powers of PSQCA

5.2. Powers of inspector of PSQCA

6. International Food Standards and Regulation **6 Hours**

6.1 World Trade Organization (agreement regarding application of sanitary measures)

6.2 Codex Alimentarius Commission (Standards)

Recommended Books:

1. Chaudhary, Z. H. (1974). Manual of food laws of Pakistan: Containing all acts, ordinances, orders, regulations, notifications and rules about pure food, foodstuffs, paddy and rice, flour and rice mills, sugar-cane and sugar, sugar factories, kerosene, tea, etc., with latest case-law and commentaries. National Law Publications.
2. Jhandyana, H. A. M., & Abid, S. A. (2020). Manual of food laws in Pakistan. Manzoor Law Book House.
3. Siddiqui, M. A. (2022). The manual of food laws. Imran Law Book House.
4. Punjab Pure Food Regulations, 2018 (https://food.punjab.gov.pk/system/files/16.%20Punjab%20Pure%20Food%20Regulations%2C%202018%20%28PPFR%2C%202018%29.pdf)

(FPPT-371) FOOD LAWS AND REGULATIONS

INSTRUCTIONAL OBJECTIVES:

1. Introduction

1.1 Define food laws and regulations?
1.2 Describe structure of food laws?
1.3 Describe importance of food laws and regulations?
1.4 What is Pure Food Ordinance 1960?
1.5 Enlist 4 criteria parameter to ensure food purity?
1.6 What is Cantonment Pure Food Ordinance 1966?

2. Punjab Food Authority Acts

2.1 Define food adulteration, misbranded food and food business operator
2.2 Describe functions of Punjab food authority?
2.3 Explain process to get license from Punjab Food Authority?
2.4 Describe standards of water, mix milk and cooking oil under Punjab Food authority regulations?
2.5 What are food additives? Enlist banned food additives under Punjab food authority regulations?
2.6 Describe labeling requirements according to Punjab food authority regulations?

3. Islamic Food Laws in Pakistan

3.1 Define Halal, Haram, Makrooh and Mushbooh in relation to food?
3.2 Describe unlawful foods and ingredients (Haram)?
3.3 Describe enforcement mechanism of Pakistan Halal Authority?
3.4 What is Punjab Halal Development Agency?

4. Pakistan Hotel & Restaurants Act

4.1 Define customer, controller, hotel & restaurant according to Pakistan hotel and restaurant law?
4.2 Describe Classification of Hotels (starring)?
4.3 Describe licensing procedure according to Pakistan hotel & Restaurant act?
4.4 Describe function of controller under Pakistan hotel and restaurant act?

5 Pakistan Standards and Quality Control Authority

5.1 Describe functions of PSQCA?
5.2 Describe licensing procedure from PSQCA?
5.3 Explain enforcement mechanism of PSQCA?

6. International Food Standards & Regulations

6.1 What is World Trade Organization (WTO)?
6.2 What is Codex Alimentarius Commission (CAC)?
6.3 What is structure of CAC? Enlist standards of CAC?
6.4 What is FDA?
6.5 What is EFSA?

(FPPT-302) FOOD PROCESS ENGINEERING

Total Contact Hours				
Theory	**32**	**T**	**P**	**C**
Practical	**96**	**1**	**3**	**2**

Learning **Outcomes**: The students will be able to understand the principles and technologies used in the processing of food, including thermal, non-thermal, and mechanical methods. They will also Learn about the impact of processing on food quality, nutrition, safety, and shelf life.

Course Contents

1. Introduction : 12 hours

- **1.1.** Food Engineering.
- **1.2.** Introduction to unit operations in the food industry.
- **1.3.** Generalized flow diagram of a food processing operation.
- **1.4.** Crystallization
- **1.5.** Sterilization, evaporation, dehydration, freezing, and lyophilization operation for preservation of foods

2. Fluids 04 hours

- **2.1** Definition and types
- **2.2** Mechanism of fluid flow
- **2.3** Fluid statics, fluid dynamics
- **2.4** Viscosity
- **2.5** Fluid heads, friction losses

3. Measurement Devices 04 hours

- **3.1** Types of manometers
- **3.2** Venturi-meter, orifice meter
- **3.3** Rotameters, pitot tubes and weirs
- **3.4** Displacement meters

4. Pumps, Blowers & compressors 04hours

- **4.1** Pumps
- **4.2** Blowers.
- **4.3** Compressors
- **4.4** Theory of compression, compressor selection.

5. Heat Transfer 6 hours

- **5.1** Modes of heat transfer,
- **5.2** Heat exchangers.
- **5.3** Fourier law & Thermal conductivity
- **5.4** Newton's Law of Heat Convection.
- **5.5** Factors Affecting Heat Transfer Coefficients
- **5.6** Classification of Heat Transfer Equipment

6. Evaporators **6 hours**

6.1 Basic principles of evaporation
6.2 Types of Evaporators
6.3 Evaporator accessories.

7. Extruders **04 hours**

7.1 Introduction to extruders.
7.2 Types of Extruders
7.3 Applications of Extruders

8. Introduction to Food Plant Layout and Hygiene **2 hours**

8.1 Significance of Plant Layout.
8.2 Selection of site
8.3 Design and construction of the building.
8.4 Layout of equipment.

9. Plant Cleaning **2 hours**

9.1 Methods of cleaning
9.2 Disinfectants and detergents.

Recommended Books:

1. Durance, T. D., & Wang, S. Y. (2022). Food processing engineering: Principles and applications. Wiley-Blackwell.
2. Pothakamury, U. R., & Morey, L. (2019). Handbook of food engineering. CRC Press.
3. Singh, R. P., & Heldman, D. R. (2020). Introduction to food engineering . Elsevier.
4. Rahman, M. S. (2019). Handbook of food processing: Food safety, quality, and engineering . CRC Press.
5. Jayaraman, S., & Muthukumarappan, K. (2021). Food engineering: Integrated approaches Springer.

(FPPT-302) FOOD PROCESS ENGINEERING

1. Introduction :

1.1. Define Food Engineering.
1.2. Enlist different unit operations in the food industry.
1.3. Draw flow diagram of a food processing plant
1.4. What is Crystallization?
1.5. Define Sterilization
1.6. What is evaporation, & dehydration
1.7. What is lyophilization ?

2. Fluids

2.1 What are fluids?
2.2 Describe the types of fluids
2.3 What is Mechanism of fluid flow?
2.4 Define Fluid statics & fluid dynamics
2.5 What is Viscosity?
2.6 Define Fluid heads
2.7 Enlist head losses

3. Measurement Devices

3.1 What are different Types of manometers?
3.2 What is the function of Venturi-meter, orifice meter
3.3 What is Rotameters,
3.4 What are Displacement meters?

4. Pumps, Blowers & compressors

4.1 What are Pumps?
4.2 Enlist the functions Blowers.
4.3 What is Compressor?
4.4 Describe the Theory of compression

5. Heat Transfer

5.1 What are Modes of heat transfer,?
5.2 Enlist types of Heat exchangers.
5.3 Define Fourier law & Thermal conductivity
5.4 State Newton's Law of Heat Convection.
5.5 What are the Factors Affecting Heat Transfer Coefficients
5.6 Give Classification of Heat Transfer Equipment

6. Evaporators

6.1. What is the Basic principles of evaporation
6.2. Enlist Types of Evaporators
6.3. Enlist Evaporator accessories.

7. **Extruders**

7.1.What is extruder?

7.2 What are the different Types of Extruders

7.3 Give Applications of Extruders

8 Introduction to Food Plant Layout and Hygiene

8.1.What is the Significance of Plant Layout.?

8.2.Enlist criteria for Selection site for food plant

8.3.Give Design and construction of the building.

.

9. Plant Cleaning

9.1 What are the Methods of cleaning?

9.2 Enlist Disinfectants and detergents.

(FPPT-302) FOOD PROCESS ENGINEERING

List of Practical **96 Hrs**

1. Perform Texture Analysis of selected food (bread. Biscuits)

2. Perform Thermal Analysis of selected food

3. Perform Extrusion of selected food (Meat & Cereals)

4. Perform Pasteurization of milk and juice

5. Identify different Pumps

6. Perform Cream Separation

7. Identify different parts of Evaporator

8. Prepare a food model plant layout (Dairy and beverage)

9. Determine viscosity of foods

10. Visit to a food plant.

(FPPTM-382) HOSPITALITY MANAGEMENT

Total Contact Hours				
Theory	32	T	P	C
Practical	96	1	3	2

Learning Outcomes: The students will be able to understand the key principles and functions of hospitality management, including operations, marketing, and customer service. They will also learn about leadership, financial management, and strategic decision-making in the hospitality industry.

Course Contents

1. Introduction **6 hours**

1.1 Hospitality Industry & Hospitality management.
1.2 Principles of Hospitality Management
1.3 The Hospitality Service Staff
1.4 The Hospitality Service System

2. Kitchen Management **10 hours**

2.1 Definitions
2.2 Kitchen planning and layout
2.3 Kitchen equipment
2.4 Cutting Terms
2.5 Cooking Terms
2.6 Health and Safety Management in Kitchen
2.7 Menu Planning and Development
2.8 Purchasing Strategy for Kitchen
2.9 Food Costing and Inventory Control

3. Food and Beverage Service **10 hours**

3.1 Introduction of Food & Beverage Division
3.2 Food & Beverage Service Terminology
3.3 Effective Communication
3.4 Laying a table setup
3.5 Types of food and beverage service operations
3.6 Order taking for the Guests
3.7 Upselling techniques in food and beverage service.

4. Event Management **6 hours**

4.1 Event, Event management, sustainable event
4.2 Main elements of event organization
4.3 Location: destination and venue
4.4 Catering
4.5 Event communication materials

Recommended Books:

1. Walker, J. R. (2021). Introduction to hospitality management Pearson.
2. Brotherton, B., & Wood, R. C. (2019). The business of hospitality management (Routledge.
3. Williams, C. (2020). Managing hospitality organizations: A systems approach SAGE Publications.
4. Enz, C. A. (2017). Hospitality management: A strategic approach. Wiley.
5. Davidson, R., & Cope, B. (2021). Sustainable hospitality and tourism management . Routledge.

(FPPTM-382) HOSPITALITY MANAGEMENT

INSTRUCTIONAL OBJECTIVES

1. Introduction

1.1 Define Hospitality.
1.2 Define guestology.
1.3 Explain the role of management in hospitality industry.
1.4 Describe the goals of hospitality industry.
1.5 List principles of hospitality management.
1.6 Describe hospitality service staff.
1.7 Describe smart objectives in hospitality industry.

2. Kitchen Management

2.1 Define Kitchen Management.
2.2 Describe kitchen planning and layout.
2.3 List different kitchen equipment.
2.4 Define different terms of cutting fruits and vegetables.
2.5 Define cooking methods.
2.6 Differentiate between shallow frying and deep frying.
2.7 Define catering.
2.8 Describe different catering equipment.
2.9 Describe principles of menu planning'
2.10 List objectives of menu development.
2.11 Explicate the purpose of food costing.
2.12 List objectives of inventory control.

3- Food and Beverage Service

3.1 Describe the role of food and beverage department in hotel industry.
3.2 Describe 5S in food and beverage service.
3.3 List types of food and beverage service.
3.4 Describe laying and table setup.
3.5 Describe the methods of order taking.
3.6 Describe food and beverage service sequence.
3.7 Define upselling in food and beverage service.

4. Event Management

5.4 Define event, event management, and sustainable events.
5.5 Describe the importance of location, destination and venue for event.
5.6 Describe specific types of catering for event.
5.7 List the services provided for event.
5.8 List the communication materials used in event management.

(FPPTM-382) HOSPITALITY MANAGEMENT

List of Practical **96 Hrs.**

1 Visit to a hotel and restaurant

2 Setup a kitchen for hotel industry

3 Perform Cutting of fruits and vegetable into basic types.

4 Prepare fruit and vegetable dishes

5 Prepare chicken dishes

6 Prepare meat dishes

7 Prepare sweet dishes

8 Prepare hot and cold beverages.

9 Setup tables for food and beverage service.

10 Make arrangements for an event

11 Show lay out different sitting styles.

FPPTPJ-392 SPECIAL PROJECT

Total Contact Hours				
Theory	0	T	P	C
Practical	192	0	6	2

Learning Outcomes: The students will be able to practically implement the knowledge and skills acquired through various courses. Students will be able to develop innovative food products different formulations and handling of trouble shootings in food industry.

Suggested Fields:

1. Dairy sector (Yogurt; Cheese, ice cream, flavor milk, including lab testing)
2. Fruits and vegetables (dehydration, canning, pickling, packaging, including lab testing)
3. Bakery and confectionery (Bread, cake, biscuits, pizza, including lab testing)
4. Snack foods (Chips, extruded. noodles, including lab testing)
5. Fats and oils (oil, ghee, including lab testing)
6. Culinary arts (Restaurant, café, hotels, catering)
7. Meat industry (Canning, poultry processing, fish processing, slaughterhouse .including lab testing)

Note: student will draft a report as per the standard format and will submit to department after presentation

MINIMUM QUALIFICATION OF INSTRUCTORS / Teachers

For Technical Subjects

- B.S degree in Food Science & Technology preferably with minimum of 1 years Industrial / Teaching experience in the related field.
- BSc (Hons.) Food Technology preferably with minimum of 2 years Industrial / Teaching experience in the related field.
- MSc. / Ph.D. degree in disciplines related to Food Science & Technology
- DAE in Food Processing & Preservation /DAE Food Technology 3-4-years Industrial / Teaching experience in the related field

Note:- Purely, Food related degree qualification will be preferred, being most relevant.

For Subjects pertaining to Humanities / Related Studies /Management

- MA degree in English/ Islamiat / Pst. with 2 years of teaching experience
- M.Sc./B.Sc. degree in IT / Computer Sciences or BE in Computer Engineering with 2-years of teaching experience
- M.Sc. degree in Mathematics with 2-years of teaching experience
- M.Sc. degree in Physics / Chemistry with 2-years of teaching experience
- MBA / BBA (Hons/ MBEcon. degree with 2-years of teaching experience

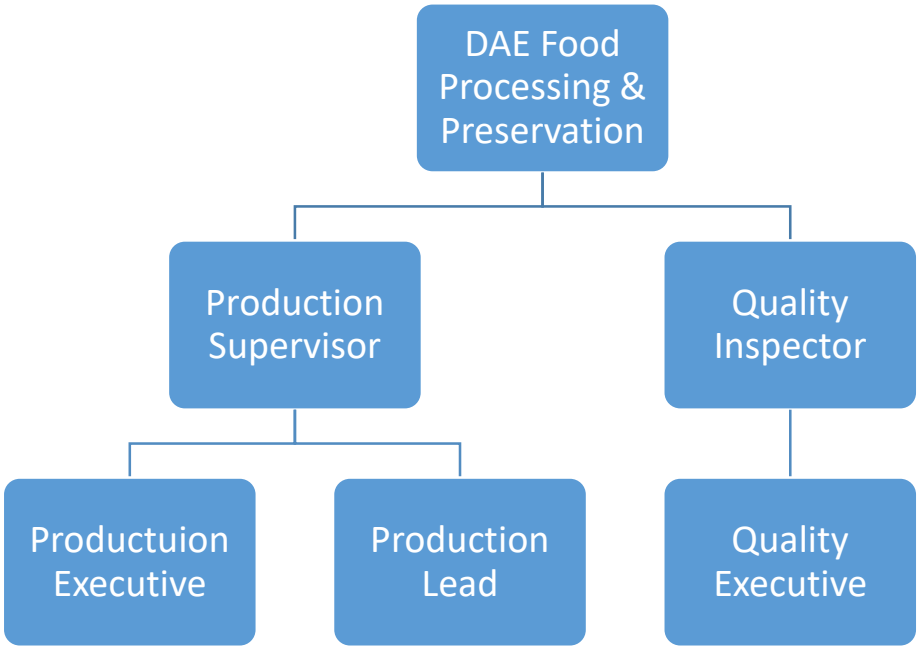
EMPLOYABILITY OF THE PASS-OUTS with Market designations and vertical progression

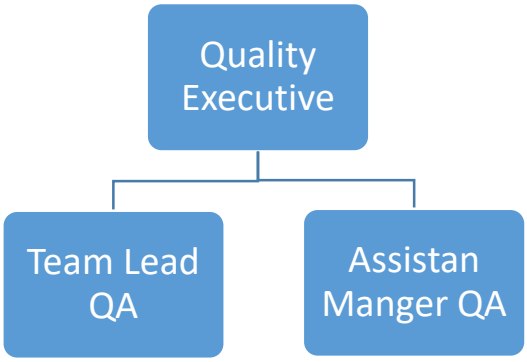
The students holding DAE qualifications in Food Processing & Preservation can seek employment in firms/companies / industry dealing in any of the following Areas / Sectors:

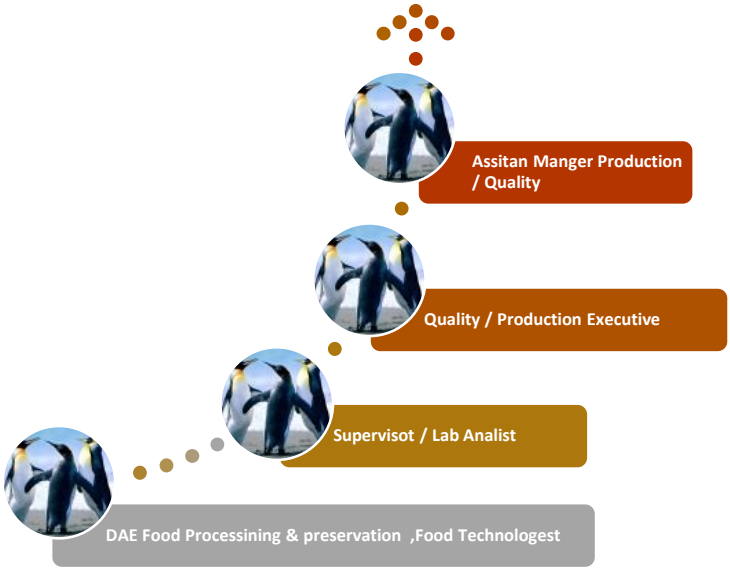
- Food Technologist in Food Industry, Restaurants & Catering sector
- Dairy Industries
- Meat & Poultry Processing Plants
- Baking Industry
- Beverages Industry
- Confectionery & Snack industry
- Flour Mills
- Rice Mills
- Auditing & Certification Company's

Starting with Supervisory position, the vertical mobility for these qualification holders is shown below:

1. Production Supervisor / Quality Inspector & Lab Analyst
2. Production / Quality Executive
3. Production & Quality Team Lead
4. Assistant Manger Production /Quality
5. Deputy Manger Production/Quality
6. Manger Production /Quality







- This pass-out graduate may also get job opportunity of teacher / instructor in TVET sector as Junior Instructor with vertical mobility upto Senior Instructor.
- They may be employed for cooking instructors, Lecturer jobs & Lab analyst in Punjab Food Authority & govt sectors. BS-12.

DETAIL OF COMMITTEE

Sr. No.	Name & Designation	Qualification	Experience
1.	**Dr. Muhammad Afzaal,** Associate Professor, Food Sciences, GCU, Faisalabad.	**PhD Food Science**	**15 years**
2.	**Dr Aftab Ahmad Khan,** Assistant Professor, Food Science, GCU Faisalabad.	**PhD Food Science**	**16 years**
3.	**Muhammad Farhan khalid,** Food safety Officer, Punjab Food Authority, House # 1, Street # 2, D Block, Shadman Town, Sahiwal.	**Mphil Food Science**	**12 years**
4.	**Muhammad Naeem** Production Manager, Rotighar.pk, Muza Pajian, District Nishtar Town, Near Haier Factory, Raiwind Road, Lahore.	**Mphil Food Science**	**10 years**
5.	**Asif Siddique** QA Compliance Manager, Venus Food Services, 24 KM, Multan Road, Lahore.	**Mphil Food Science**	**13 years**
6.	**Dr. Muhammad Ajmal** HOD Food Technology. GCT Sahiwal.	**PhD Food Science**	**30 years**
7.	**Shabbir Ahmad** HOD Food Department, GCT Faisalabad.	**DAE Food Technology**	**30 years**
8.	**M. Umer Farooq** Lecturer, GTTI, Gulberg, Lahore. Cell: 0300-3331203	**Mphil Food Science**	**20 years**