CURRICULUM FOR

DIPLOMA OF ASSOCIATE ENGINEER

IN

FOOD PROCESSING & PRESERVATION TECHNOLOGY

(3 - Years Course)

DAE FOOD PROCESSING AND PRESERVATION TECHNOLOGY
SCHEME OF STUDIES

FIRST YEAR

			T	P	C
Gen	111	Islamiat/Pakistan Studies	1	0	1
Eng	112	English	2	0	2
Comp	122	Computer Applications	1	3	2
Ch	123	Applied Chemistry	2	3	3
Phy	113	Applied Physics	2	3	3
Math	123	Applied Mathematics-I (Paper A +B)	3	0	3
MTF	111	Engineering Drawing	0	3	1
MTF	121	Workshop Practice	0	3	1
FPPT	113	Introduction to Food Science	2	3	3
FPPT	133	Fundamental of Food processing & Preservation	2	3	3
		T o t a l	**15**	**21**	**22**

SECOND YEAR

			T	P	C
Gen	211	Islamiat / Pakistan Studies	1	0	1
Mgm	221	Business Management and Industrial Economics	1	0	1
Math	233	Applied Mathematics-II (Paper A +B)	3	0	3
FPPT	213	Fruit and Vegetable Processing Technology	2	3	3
FPPT	223	Cereal and Baking Technology	2	3	3
FPPT	233	Dairy Processing Technology	2	3	3.
FPPT	242	Oil and Fat Processing Technology	1	3	2
FPPT	252	Sugar and Confectionery Technology	1	3	2
FPPT	273	General & Food Microbiology	2	3	3
FPPT	283	Food Chemistry & Instrumentation	2	3	3
		T o t a l	**17**	**24**	**24**

THIRD YEAR

			T	P	C
Gen	311	Islamiat / Ethics and Pakistan Studies	1	0	1
Mgm	321	Business Communication and Tech. Writing	1	0	1
Mgm	311	Industrial Mgmt. and Human Relations	1	0	1
FPPT	314	Meat Poultry and Fish Technology	3	3	4
FPPT	323	Beverages Processing Technology	2	3	3
FPPT	332	Food Packaging	1	3	2
FPPT	343	Quality Control and Waste Management	2	3	3
FPPT	353	Food Engineering	2	3	3
FPPT	362	Special Project	0	6	2
FPPT	372	Food Plant Layout and Hygiene	1	3	2
FPPT	382	Quality Control	1	3	2
FPPT	392	Waste Management	1	3	2
		T o t a l	**14**	**24**	**22**

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DAE Technology

اسلامیات/مطالعہ پاکستان

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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 تنالو البر حتی تنفقوا مما تحبون
1.2 واعتصموا بحبل اللّٰہ جمیعا" ولا تفرقو
1.3 ولا یجر منکم 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 فخرزو ومانھی عنھوانتھوا
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 سنہ المسنمون من لسانہ ویدہ

5- قل امنت باللہ ثم استقم

6- خیرکم خیرکم لاہلہ

7- سباب المسلم فسوق وقتالہ کفر

8- المومن اخو المومن

9- کل المسلم علی المسلم حرام بمعہ وما لہ وعرضہ

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

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 مقاصد: 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 کی دو 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

-4 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 لفظی و اصطلاحی معنی بیان کر سکے

عقیدے اور عبادت کا فرق بیان کر سکے

عبادات (نماز، روزہ، حج، زکواۃ) کے فوری اثرات 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	GEN 101	ڈی	بی	سی
اخلاقیات سال اول		1	0	1
حصہ دوم مطالعہ پاکستان		کل وقت - 20 گھنٹے		

موضوعات

اخلاقیات کی تعریف اور اہمیت

اخلاقیات کا معیار (قانون، عقل، الہامی 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

نصاب اخلاقیات (سال اول)

تدریسی مقاصد

عمومی مقاصد: اعلیٰ اخلاق کی وجہ سے انکی ترقی میں تکمل قدر فضاء 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) Term III

حصہ دوم　　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 و جمود غلامی کے تصورات

☆ نظریہ پاکستان

قیام پاکستان کی اساس (دین اسلام) قیام پاکستان کی غرض و غایت نظریہ پاکستان کی وضاحت - نظریہ پاکستان اور علامہ 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 الاسلام - (کراچی) 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 - ندوت العلماء مدرسۃ الاسلام ، 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

Eng-112: Technical English

Total Contact Hours:		T	P	C
Theory:	64	2	0	2
Practical:	0			

Aims: At the end of the course, the students will be equipped with cognitive skill have the capability of presenting facts in a systematic and logical manner to meet the demands of English language in the dynamic fields commerce and industry. The course is designed to inculcate skills of reading, writing and comprehending the facts from the written material. This will also help the students in developing speaking skill.

Course Contents

1. PROSE/TEXT **13 Hours**

1.1 First eight essays of Intermediate English Book-II.

2. GROUP DISCUSSION/SPEAKING (Sessional Evaluation) **13 Hours**

3. GRAMMAR **19 Hours**

3.1 Sentence structure
3.2 Tenses (correct use of verb/tense)
3.3 Parts of speech
3.4 Change of direct speech into indirect form
3.5 Words often confused.

4. COMPOSITION **13 Hours**

4.1 Business letters
4.2 Applications for job, character certificate and grant of scholarship
4.3 Essay writing (topics specified in Instructional objectives).

5. TRANSLATION **6 Hours**

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

Eng-112: TECHNICAL ENGLISH

Instructional Objectives:

1. Demonstrate Better Reading, Comprehension and Vocabulary.
- 1.1 Describe and narrate in simple English.
- 1.2 Identify the author and the essay.
- 1.3 Write summaries of the textual essays.
- 1.4 Identify facts and ideas.

2. Listen and Speak English Clearly (Sessional Evaluation).
- 2.1 Converse fluently.
- 2.2 Express ideas clearly.

3. **Apply the Grammatical Rules to Writing a Speaking.**
- 3.1 Describe sentence structure.
  - 3.1.1 Identify kinds of sentences.
- 3.2 Use correct verb/tense in sentences.
  - 3.2.1 Identify the tense of a sentence.
- 3.3 Narrate the direct speech in indirect form.
- 3.4 Distinguish between confusing words.

4. **Apply the Concepts of Composition Writing to Practical Situations.**
- 4.1 Write letters to communicate messages in the business world (inquiry, placing orders, complaints etc.).
  - 4.1.1 Identify parts of a business letter.
  - 4.1.2 Describe the qualities of a good business letter.
- 4.2 Write applications for job opportunities, grant of character certificate and grant of scholarship.
  - 4.2.1 Describe the structure of application.
  - 4.2.2 Design and compose Curriculum Vitae (C.V.), Bio-data or Resume separately.
- 4.3 Write essays pertaining to Technical Education, Science and our life, Computer, Environmental Pollution, Duties of a student and Life of a Technician.
  - 4.3.1 Identify major kinds of essay.

5. **Apply Rules of Translation.**
- 5.1 Convert sentences from Urdu to English.
- 5.2 Translate a passage of Urdu into English making appropriate substitution of words.

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Comp-122 COMPUTER APPLICATIONS

Total contact hours

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

Pre-requisite None

AIMS This subject will enable the student to be familiar with the operation of a Micro-computer. He will also learn DOS, BASIC language and word processing to elementary level.

COURSE CONTENTS

1. ELECTRONIC DATA PROCESSING (EDP) 6 Hours

1.1 Basics of computers
1.2 Classification of computers
1.3 Block diagram of a computer system
1.4 Binary number system
1.5 BIT, BYTE, RAM, ROM, EROM, EPROM
1.6 Input and output devices
1.7 Secondary storage media details
1.8 Processors and types
1.9 Using computer for system software
1.10 Using computers for application software.
1.11 Common types of software and their application.

2. DISK OPERATING SYSTEM (DOS) 6 Hours

2.1 Internal commands
2.2 External commands
2.3 Batch files
2.4 Advance features.

3. BASIC LANGUAGE 10 Hours

3.1 Introduction to high level languages
3.2 Introduction to BASIC
3.3 REM Statement
3.4 Assignment statement
3.5 Input statement
3.6 Read-Data statement
3.7 IF-THEN statement
3.8 IF-THEN Else statement
3.9 FOR-NEXT statement

3.10 DIM statement
3.11 L PRINT statement
3.12 STOP statement
3.13 END statement
3.14 Logic of a BASIC Programme
3.15 Running a BASIC Programme
3.16 Saving and Retrieving a Programme
3.17 Advance features

4. WORD PROCESSING **7 Hours**

4.1 Starting word processor session
4.2 Opening a document
4.3 Saving a document
4.4 Ending word processor session (Temporarily)
4.5 Retrieving a document
4.6 Spell check
4.7 Margins and tab setting
4.8 Aligning Paragraph
4.9 Printing a document
4.10 Advance features

5. COMPUTER GRAPHIC IN BASIC **3 hours**

5.1 Graphic fundamentals
5.2 Points and lines
5.3 Dots in space
5.4 A lightening blot
5.5 Shapes
5.6 Expanding circles and rectangles

RECOMMENDED BOOKS

1. Ron S. Gottfrid, Programming with BASIC,
2. Any Word Processor Latest Release (e.g., Word, Word-Perfect etc).
3. ABC'S of DOS (latest release).
4. Judd Robbins, Mastering DOS 6.0 and 6.2

Comp-122 COMPUTER APPLICATIONS

INSTRUCTIONAL OBJECTIVES

1. UNDERSTAND ELECTRONIC DATA PROCESSING (EDP).

1.1 Describe basics of computers.
1.2 Enlist different classification of computers.
1.3 Explain block diagram of a computer system.
1.4 Describe binary number system.
1.5 State the terms used in computers such as BIT, BYTE, RAM, ROM, EROM, EPROM.
1.6 Identify input and output devices.
1.7 Describe secondary storage media.
1.8 Explain processor.
1.9 Name different types of processors.
1.10 Explain the use of computer for system software.
1.11 Explain the use of computer for application software.
1.12 Enlist common types of software and their application.
1.13 Explain various application of above softwares mentioned in 1.12

2. UNDERSTAND DISK OPERATING SYSTEM (DOS).

2.1 Explain the use of various internal command of DOS.
2.2 Explain the use of various external command of DOS.
2.3 Describe batch files.
2.4 Identify advanced features

3. UNDERSTAND BASIC LANGUAGE.

3.1 Explain high level languages.
3.2 Explain Basic language.
3.3 Describe Rem statement
3.4 Describe assignment statement
3.5 Explain Input statement
3.6 Explain Read-Data statement
3.7 Explain If-Then Statement
3.8 Explain If-then-Else Statement
3.9 Explain For-Next Statement
3.10 Explain DIM Statement
3.11 Explain LPRINT statement
3.12 Explain stop statement
3.13 Explain end Statement
3.14 Describe Logic of Basic program
3.15 Describe running a Basic Program
3.16 Describe saving & retrieving Basic Program
3.17 Describe some Advance features of Basic program

4. UNDERSTAND WORD PROCESSING SESSION

4.1. Describe word-processing
4.2 Name command to be entered on Dos-prompt to load word-processor
4.3 Identify initial screen
4.4 Describe the command to open a document
4.5 Describe the procedure for naming the document
4.6 Explain importance of giving extension to a document
4.7 Describe saving and retrieving a document
4.8 Explain importance of saving the work at regular intervals
4.9 State temporarily Ending word-processing session & document retrieval
4.10 State procedure to re-enter word processor
4.11 State procedure to re-open the document and editing
4.12 Describe spell-check facility
4.13 Describe Margins & Tab Setting
4.14 Describe to align paragraph
4.15 Describe Re-editing techniques
4.16 Describe procedure to set-up printer
4.17 Describe command for printouts
4.18 Explain multiple-copy printout procedure
4.19 Explain some advance features
4.20 Describe procedure of condensed printing
4.21 Describe procedure for change of fonts

5. UNDERSTAND PROGRAMMING INSTRUCTIONS FOR COMPUTER GRAPHIC IN BASIC LANGUAGE

5.1 Identify graphic fundamentals in basic language
5.2 Explain to draw points and lines
5.3 Explain to draw dot in space
5.4 Explain to draw lighting blot
5.5 Explain to draw shapes
5.6 Explain to draw expanding circles and rectangles

Comp-122 COMPUTER APPLICATIONS

LIST OF PRACTICALS **96 hours**

DOS

1 Identify key board, mouse, CPU, disk drives, disks, monitor & printer
2 Practice for booting up of a computer system with DOS system disk and power off system at DOS prompt
3 Practice for CLS, VER, VOL, DATE & TIME commands
4 Practice for COPY, REN commands
5 Practice for DEL, TYPE, PATH, PROMPT, COPY CON, MD, CD, RD commands
6 Practice of the practicals at S. No. 3, 4, 5
7 Practice for FORMAT command with /s, /4, /u switches
8 Practice for DISKCOPY, DISKCOMP commands
9 Practice for SCANDISK, XCOPY, DELTREE, TREE, LABEL commands
10 Practice for PRINT, UNDELETE commands
11 Practice for the practicals at S. No. 8, 9, 10, 11
12 Practice for creating a batch file

BASIC

1 Practice for loading & unloading BASIC software and identify role of function keys in Basic
2 Identify role of various keys in continuation with ALT key in BASIC programming
3 Practice for CLS, LOAD, SAVE, FILE, RENUM command by loading any existing BASIC Program
4 Practice for editing any existing BASIC Program
5 Prepare BASIC Program to display sum of two numbers using INPUTS
6 Prepare BASIC Program to display sum of two numbers using READ-DATA
7 Prepare BASIC Program to multiply two numbers
8 Prepare BASIC Program to calculate Area of Rectangle, when length and width are given
9 Prepare BASIC Program to calculate area of a circle when radius/diameter is given
10 Prepare very simple BASIC Programs using IF-THEN-ELSE and FOR-NEXT statement
11 Identify DIM statement
12 Practice for LPRINT statement for various Programs hard-copy output

WORD PROCESSING

1 Practice for loading & unloading a word processor
2 Practice for creating document & saving it
3 Practice for spell-check facility of the word-processor
4 Practice for editing an existing document
5 Practice for various word-processing Menu Options
6 Practice for printing a document
7 Practice for margin and TAB setting and document alignment
8 Practice for some advance features

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 3 hours

1.1 Scope and significance.
1.2 Orientation with reference to this technology.
1.3 Terms used & units of measurements in the study of chemistry.

2 FUNDAMENTAL CONCEPTS OF CHEMISTRY 3 hours

2.1 Symbols, valency, radicals, formulas.
2.2 Chemical reactions y their types.

3 ATOMIC STRUCTURE. 4 hours

3.1 Sub-atomic particles.
3.2 Architecture of atoms of elements, Atomic No. and Atomic Weight.
3.3 Periodic classification of elements and periodic law.

4. CHEMICAL BOND 3 hours

4.1 Nature of chemical bond.
4.2 Electrovalent bond with examples.
4.3 Covalent bond (polar and non-polar) sigma and Pi bonds with examples.
4.4 Co-ordinate bond with examples.

5. GASES AND LIQUIDS 4 hours

5.1 Liquid and gaseous state.
5.2 Liquids and their general properties (density, viscosity, surface tension capillary action etc).
5.3 Gases and their general properties.
5.4 Gas laws (Boyle's law, Charle's law, and Graham law of diffusion etc.).
5.5 Problems involving gas laws.

6. WATER. 4 hours

6.1 Chemical nature and properties.
6.2 Impurities.
6.3 Hardness of water (types, causes and removal).
6.4 Scales of measuring hardness (degrees Clark, french, ppm, mg per liter).
6.5 Boiler feed water, scales and treatment.
6.6 Sea-water desalination, sewage treatment.
6.7 Sterilization of water.

7. ACIDS, BASES AND SALTS. 3 hours

7.1 Definitions with examples.
7.2 Properties, their strength, basicity and Acidity,
7.3 Salts ad their classification with examples.
7.4 pH-value and scale.

8. OXIDATION AND REDUCTION. 3 hours

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

9. NUCLEAR CHEMISTRY. 3 hours

9.1 Introduction and.
9.2 Radioactivity (alpha, beta and gamma rays)
9.3 Half life process.
9.4 Nuclear reaction and transformation of elements.
9.5 Radiations and Food preservation.

10. CORROSION. 3 hours

10.1 Introduction with causes.
10.2 Types of corrosion.
10.3 Rusting of iron
10.4 Protective measures against corrosion.

11. FOOD PRESERVATIVES 3 hours

11.1 Nature of food preservatives.
11.2 Some important food preservatives.
11.3 Classification of preservatives.
11.4 Uses of preservatives.

12. ALLOYS. 3 hours

12.1 Introduction with need.
12.2 Preparation and properties.
12.3 Some important alloys and their composition.
12.4 Uses.

13. CHEMICAL ASPECTS OF FOOD. 4 hours

13.1 Introduction.
13.2 Essential food ingredients
13.3 Carbohydrates
13.4 Proteins
13.5 Fats.

14. PLASTICS AND POLYMERS. 3 hours

14.1 Introduction.
14.2 Polymerization and its mechanism.
14.3 Synthetic fibers.
14.4 Uses of polymers.

15. DYES AND COLOURS. 3 hours

15.1 General Introduction.
15.2 Chemical nature of dye-stuffs.
15.3 Classification of dyes and their uses.
15.4 Colouring agents for food.

16. POLLUTION. 3 hours

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

17. INTRODUCTION TO ORGANIC CHEMISTRY. 3 hours

17.1 Introduction and significance.
17.2 Classification of organic compounds.
17.3 Nomenclature of organic compounds.

18. CARBOHYDRATES. 3 hours

18.1 Introduction.
18.2 Classification.
18.3 Properties and uses.

19. PROTEINS. 3 hours

19.1 Introduction.
19.2 Chemical nature and sources.
19.3 Properties and uses.

20. FATS and OILS. 3 hours

20.1 Introduction.
20.2 Chemical nature.
20.3 Sources and properties.
20.4 Importance as food.

Ch-123 APPLIED CHEMISTRY

INSTRUCTIONAL OBJECTIVES

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

1.1 Define chemistry and its terms.
1.2 Define units of measurements in the study of chemistry.
1.3 Explain the importance of chemistry in various fields of specialization.
1.4 Illustrate the role of chemistry in this technology.

2. UNDERSTAND LANGUAGE OF CHEMISTRY AND CHEMICAL REACTIONS.

2.1 Define symbol, valency, radical, formula with examples of each.
2.2 Write chemical formula of common compounds.
2.3 Define chemical reaction and equations.
2.4 Describe types of chemical reactions with examples.
2.5 List chemical formula of common substances used in the respective subject.

3. UNDERSTAND THE STRUCTURE OF ATOMS AND ARRANGEMENT OF SUB ATOMIC PARTICLES IN THE ARCHITECTURE OF ATOMS.

3.1 Define atom.
3.2 Describe the fundamental sub atomic particles
3.3 Distinguish between atomic No., mass No. and between isotope and isobars.
3.4 Explain the arrangements of electrons in different shells and sub energy levels.
3.5 Explain the grouping and placing of elements in the periodic table.
3.6 State the periodic law of elements.
3.7 Describe the trend properties of elements based on their position in the periodic table.
3.8 Describe general characteristics of a period and a group.

4. UNDERSTAND THE NATURE OF CHEMICAL BOUNDS.

4.1 Define chemical Bond.
4.2 Describe the nature of chemical bond.
4.3 Differentiate between electrovalent and covalent bonding.
4.4 Explain the formation of polar and non polar sigma and pi- bond with examples.
4.5 Explain the nature of coordinate bond with examples.

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

5.1 Describe the liquid and gaseous states of matter.
5.2 Describe the general properties of liquid.
5.3 Describe the general properties of gases.
5.4 State Boyle's law, Charle's law, Graham's law of diffusion, Dalton's law of partial pressure.
5.5 State the mathematical forms of these laws
5.5 Derive gas equation.
5.6 Solve problems on gas laws and gas equations.

6. UNDERSTAND CHEMICAL NATURE OF WATER.

6.1 Describe the chemical nature of water with its formula.
6.2 Describe the general impurities present in water.
6.3 Explain the causes and methods to remove hardness of water.
6.4 Express hardness in different units like mg/per litre, p.p.m, degrees clark and degrees french.
6.5 Describe the formation and nature of scales in boiler feed water.
6.6 Explain the method for the treatment of scales.
6.7 Explain the sewage treatment and desalination of sea water.
6.8 Describe methods of sterilization of water.

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

7.1 Define acids, bases and salts with examples.
7.2 Describe general properties of acids and bases.
7.3 Define and differentiate between acidity and basicity and use the terms.
7.4 Define salts and give their classification with examples.
7.5 Explain pH value of solution and pH scale.

8. UNDERSTAND THE PROCESS OF OXIDATION AND REDUCTION.

8.1 Define oxidation.
8.2 Explain the oxidation process with examples.
8.3 Define reduction.
8.4 Explain reduction process with examples.
8.5 Define oxidizing and reducing agents and give at least six examples of each.
8.6 Define oxides.

8.7 Classify the oxides with examples.

9. UNDERSTAND THE FUNDAMENTALS OF NUCLEAR CHEMISTRY.

9.1 Define nuclear chemistry and radio activity.
9.2 Differentiate between alpha, beta and gamma particles.
9.3 Explain half life process.
9.4 Explain at least six nuclear reactions resulting in the transformation of some elements.
9.5 Give six important uses of isotopes.
9.6 Explain the use of radiations in food preservation.

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

10.1 Define corrosion.
10.2 Describe different types of corrosion.
10.3 State the causes of corrosion.
10.4 Explain the process of rusting of iron.
10.5 Describe methods to prevent/control corrosion.

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

11.1 Define a preservative.
11.2 List some important preservatives with their chemical formula.
11.3 Explains general uses of preservatives.
11.4 Classify food preservatives.
11.5 Explain action and specific use of some preservative agents.

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

12.1 Define alloy.
12.2 Explain methods for the preparation of alloys.
12.3 Describe important properties of alloys.
12.4 Explain common properties and uses of alloys

13. UNDERSTAND THE NATURE OF FOOD.

13.1 Define food.
13.2 Describe food ingredients like carbohydrates, proteins and fats.
13.3 Explain importance, properties and uses of food ingredients.

14. UNDERSTAND THE NATURE OF PLASTICS AND POLYMERS.

14.1 Define plastics and polymers.
14.2 Explain the mechanism of polymerization.
14.3 Explain the preparation and uses of synthetic fibre.
14.4 List some important synthetic fibers used in textile industry.

15. UNDERSTAND THE CHEMICAL NATURE OF DYES AND COLOURS.

15.1 Define dyes and colours.
15.2 Describe chemical nature of the dye stuffs.
15.3 Classify dyes and state their uses.
15.4 Enlist the colouring agents for food.

16. KNOW THE NATURE OF POLLUTION.

16.1 Define pollution (air, water, food).
16.2 Describe causes of environmental pollution.
16.3 Enlist some common pollutants.
16.4 Describe methods to prevent pollution.

17. UNDERSTAND THE NATURE AND SIGNIFICANCE OF ORGANIC CHEMISTRY.

17.1 Define organic chemistry.
17.2 State the uses of organic chemistry in modern world.
17.3 Classify the organic compounds.
17.4 Explain functional group.
17.5 Name organic compounds on the basis of I.U.P.A.C. system

18. UNDERSTAND CARBOHYDRATES AS A CHEMICAL CLASS

18.1 Define carbohydrates and give examples.
18.2 Explain their structure.
18.3 Classify carbohydrates.
18.4 State some important chemical and physical properties.
18.5 Give uses of carbohydrates.

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

19.1 Define protein and cite examples with sources.
19.2 Define amino acids and give examples.
19.3 Explain some important Chemical and Physical properties of proteins.
19.4 Explain uses as food ingredients.

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

20.1 Define fat and oil with examples.
20.2 Describe chemical nature and sources of fats and oils.
20.3 Differentiate fats from oils.
20.4 Give some important physical and chemical properties of fats.
20.5 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 Cu SO.
11. To get introduction with the scheme of analysis of salts for basic radicals.
12. To analyse 1st group radicals (Ag^{+} - Pb^{++} - Hg^{+}).
13. To make practice for detection 1st 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 he 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 Hill Co., New Delhi.
4. Qammar Iqbal, Chemistry for Engineers and Technologists.

Phy-113 APPLIED PHYSICS

Total Contact Hours

			T	P	C
Theory	64				
Practicals	96	2	3	3	

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. 4 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 WORK ,POWER & ENERGY. 5 Hours.

5.1 Work
5.2 Power
5.3 Energy & its type.

5.3.1 Kinetic Energy (K.E) ,Potential Energy (P.E)

5.4 Law of Conservation of Energy.

5.5

6. FRICTION. 4 Hours

6.1 Friction, Types of Friction, Limiting Friction, Angle of Friction.

6.2 Laws of Friction.

6.3 Advantages & Disadvantages of Friction.

7 WAVE MOTION. 5 Hours

7.1 Review Hook's law of elasticity

7.2 Motion under an elastic restoring force

7.3 Characteristics of simple harmonic motion

7.4 S.H.M. and circular motion

7.5 Simple pendulum

7.6 Wave form of S.H.M.

7. 7 Resonance

7.8 Transverse vibration of a stretched string

8 SOUND. 5 Hours

8.1 Longitudinal waves

8.2 Intensity, loudness, pitch and quality of sound

8.3 Units of Intensity of level and frequency response of ear

8.4 Interference of sound waves silence zones, beats

8.5 Acoustics

8.6 Doppler effect.

9 LIGHT. 3 Hours

9.1 Review laws of reflection and refraction , Image formation by lenses

9.2 Optical instruments

9.3 Wave theory of light

9.4 Interference, diffraction, polarization of light waves

10 OPTICAL FIBER. 4 Hours

10.1 Optical communication and problems

10.2 Review total internal reflection and critical angle

10.3 Structure of optical fiber

10.4 Fiber material and manufacture

10.5 Optical fiber - uses.

11 LASERS. 3 Hours

11.1 corpuscular theory of light

11.2 Emission and absorption of light

11.3 Stimulated absorption and emission of light

11.4 Laser principle

11.5 Structure and working of lasers
11.6 Types of lasers with brief description.
11.7 Applications (basic concepts)

12 HEAT. 4 hours.

12.1 Review of calorimetry and gas laws and mode of transfer of heat
12.2 Thermal expansion of solids, liquids and gases
12.3 Heat of fusion, vaporization
12.4 Law of cooling
12.5 Thermoelectricity
12.6 Thermocouple.

13 THERMODYNAMICS. 4 Hours

13.1 Heat energy and internal energy
13.2 First law of thermodynamics & applications
13.3 Efficiency of heat engine
13.4 Second law of thermodynamics (both statements)
13.5 Heat engine and refrigerator.

14 MODERN PHYSICS 5 Hours

14.1 Relative Motion
14.2 Einstein Postulates
14.3 Black Body Radiation's
14.4 Photo -electric Effect
14.5 x-rays, Production, Properties and uses.

15 MAGNETIC MATERIALS. 2 Hours

15.1 Magnetism
15.2 Domains theory
15.3 Para, dia and ferromagnetism and magnetic materials
15.4 B.H. curve and hysterics loop.

16 SOLID STATE PHYSICS 6 Hours

16.1 crystalline structure of solids
16.2 Band theory of solids
16.3 Conductors, semiconductors, insulators
16.4 P-type and N-type materials
16.5 P-N junction and P-N junction as a diode
16.6 Semi conductor devices:-
16.6.1 Light emitting diodes
16.6.2 Photo diodes
16.6.3 Solar cell

RECOMMENDED BOOKS

1 Fundamentals of Physics Vol-I and II for intermediate classes
2 Farid Khawaja, Fundamentals of Physics Vol-I and II
3 Wells and Slusher, Schaum's Series Physics .
4 Nelkon and Oyborn, Advanced Level Practical Physics
5 Mehboob Ilahi Malik and Inam-ul-Haq, Practical Physics
6 Wilson, Lasers - Principles and Applications
7 M. Aslam Khan and M. Akram Sandhu, Experimental Physics Note Book

Phy-113 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 head & tail rule
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 APPLY CONCEPT OF WORK, POWER AND ENERGY TO PRACTICAL SOLUTIONS AND TECHNOLOGICAL PROBLEMS

5.1 Explain work and derive expression s in different conditions
5.2 Explain power, I.H.P, B.H.P
5.3 Solve technological problems relating to work and power
5.4 Explain energy and its types and various sources
5.5 Explain and derive the expression for K.E & P.E and interconversion. Solve problem
5.6 Law of conservation of momentum

6 UNDERSTAND THE CONCEPT OF FRICTION AND APPLY TO SOLVE THE TECHNOLOGICAL PROBLEMS

6.1 Describe friction and how it is developed
6.2 Describe static and dynamic friction, co-eff. Of friction, limiting friction and angle of repose
6.3 Explain the laws of friction
6.4 Describe advantages and disadvantages of friction
6.5 Use the above concepts in solving the technological problems

7 USE CONCEPTS OF WAVE MOTION IN SOLVING RELEVANT PROBLEMS.

7.1 Explain Hook's Law of Elasticity
7.2 Derive formula for Motion under an elastic restoring force
7.3 Derive formulae for simple harmonic motion and simple pendulum
7.4 Explain wave form with reference to S.H.M. and circular motion
7.5 Explain Resonance
7.6 Explain Transverse & longitudinal waves.
7.7 Use the above concepts and formulae of S.H.M. to solve relevant problems.

8 UNDERSTAND CONCEPTS OF SOUND.

8.1 Explain the concepts: Intensity, loudness, pitch and quality of sound
8.2 Explain units of Intensity level and frequency response of ear
8.3 Explain phenomena of silence zones, beats
8.4 Explain Acoustics of buildings
8.5 Explain Doppler effect giving mathematical expressions and its application

9 USE THE CONCEPTS OF GEOMETRICAL OPTICS TO LENSES.

9.1 Explain laws of reflection and refraction and draw the images by ray diagrams
9.2 Use the concepts of image formation by mirrors and lenses to describe working of optical instruments, e.g. microscopes, telescopes, cameras.
9.3 Understand wave theory of light
  9.3.1 Explain wave theory of light
  9.3.2 Explain phenomena of interference, diffraction, and polarization of light waves
  9.3.3 Describe uses of polarization

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

10.1 Explain the structure of the Optical Fiber
10.2 Explain its principle of working
10.3 Describe use of optical fiber in industry and medicine.

11 UNDERSTAND THE STRUCTURE, WORKING AND USES OF LASERS.

11.1 Explain the stimulated emission of radiation
11.2 Explain the laser principle
11.3 Describe the structure and working of lasers
11.4 Distinguish between types of lasers
11.5 Describe the applications of lasers in the fields mentioned in the course contents.

12 UNDERSTAND CONCEPTS OF HEAT.

12.1 Explain calorimetry and modes of transfer of heat
12.2 Explain Gas laws giving mathematical expressions
12.3 Explain Thermal expansion of solids, liquids and gases
12.4 Distinguish between heat of fusion, vaporization
12.5 Explain Law of cooling and describe latent heat
12.6 Explain basic concepts of Thermoelectricity
12.7 Describe Thermocouple, giving its principle, structure and working.

13 UNDERSTAND LAWS OF THERMODYNAMICS.

13.1 Distinguish between heat energy and internal energy
13.2 Explain first law of thermodynamics giving its applications by defining Isothermal and adiabatic process
13.3 Explain second law of thermodynamics describing alternate statements
13.4 Distinguish between work of heat engine and refrigerator.

14 UNDERSTAND THE CONCEPT OF MODERN PHYSICS .

14.1 Describe Einstein postulates
14.2 Describe relative motion
14.3 Describe black body radiation
14.4 Describe the Photo electric effect
14.5 Explain the production, properties and uses of X-rays

15 UNDERSTAND BASIC CONCEPTS AND CLASSIFICATION OF MAGNETIC MATERIALS.

15.1 Explain domains theory of magnetism
15.2 Distinguish between para, dia and ferromagnetism and magnetic materials
15.3 Distinguish between B and H
15.4 Describe B.H. Curve
15.5 Describe hysterics loop.

16 UNDERSTAND BASIC CONCEPTS OF SOLID STATES PHYSICS.

16.1 Explain crystalline structure of solids
16.2 Describe band theory of solids
16.3 Distinguish between conductors, semiconductors and insulators
16.4 Describe semiconductors giving examples with reference to their structure
16.5 Distinguish between P-type and N-type materials

16.6 Explain working of P-N junction as a diode
16.7 Explain working of solar, cell light emitting diodes and photodiodes

Phy-113 APPLIED PHYSICS

LIST OF PRACTICALS.

1 Find the volume of a given solid cylinder using vernier callipers.
2 Find the area of cross-section of the given wire using micrometer screw gauge.
3 Prove that force is directly proportional to (a) mass, (b) acceleration, using fletchers' trolley.
4 Verify law of parallelogram of forces using Grave-sands apparatus.
5 Verify law of triangle of forces and Lami's theorem
6 Determine the weight of a given body using
   a) Law of parallelogram of forces
   b) Law of triangle of forces
   c) Lami's theorem
7 Find Young's Modules of Elasticity of a metallic wire.
8 Verify Hook's Law using helical spring.
9 Study resonance of air column in resonance tube and find velocity of sound.
10 Find the frequency of the given tuning fork using resonance tube.
11 Find velocity of sound in rod by Kundt's tube.
12 Find the refractive index between glass and air by prism.
13 Find focal length of converging lens by displacement method.
14 Find focal length of diverging lens using converging lens.
15 Find angular magnification of an astronomical telescope.
16 Find angular magnification of a simple microscope (magnifying glass)
17 Determine the specific heat of lead shots.
18 Find the coefficient of linear expansion of a metallic rod.
19 Find the heat of vaporization.
20 To find the co-eff. Of friction between glass and wood by using incline plane.
21 Study an optical fiber.

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MATH-113: Applied Mathematics-I

	T	P	C
Total Contact Hrs:	3	0	3

Theory: 96 Hrs.
Practical: 0

Aims & Objectives:

After completing the course the students will be able to:

(i) Solve problems of Algebra, Trigonometry, Vectors, Phasors and mensuration etc.

(ii) Develop skill, mathematical attitudes and logical perception.

Course Contents:

1. SET AND NUMBERS. 3 Hrs.
   - 1.1 Set and subsets.
   - 1.2 Product of sets.
   - 1.3 Intervals.
   - 1.4 Real and Complex numbers.

2. QUADRATIC EQUATIONS. 8 Hrs.
   - 2.1 Standard form.
   - 2.2 Methods of solving quadratic equations.
   - 2.3 Nature of roots of a quadratic equation.
   - 2.4 Relation between roots and coefficients.
   - 2.5 Formation of quadratic equations.
   - 2.6 Problems.

3. MATRICES AND DETERMINANTS. 10 Hrs.
   - 3.1 Definition of Matrix.
   - 3.2 Some important matrices.
   - 3.3 Algebra of Matrices.
   - 3.4 Determinants and their properties.
   - 3.5 Singular and non-singular matrices.
   - 3.6 Adjoint and inverse of a matrix.
   - 3.7 Solution of linear equations.
   - 3.8 Problems.

4. SEQUENCES AND SERIES. 12 Hrs.
   - 4.1 Arithmetic sequence.
   - 4.2 Arithmetic means.
   - 4.3 Arithmetic series and its sum.
   - 4.4 Geometric sequence.
   - 4.5 Geometric means.

4.6 Geometric series and its sum.
4.7 Infinite Geometric series and its sum.
4.8 Problems.

5. BINOMIAL THEOREM. 6 Hrs.
5.1 Factorials.
5.2 Statement of Binomial Theorem.
5.3 General term.
5.4 Binomial series.
5.5 Problems.

6. TRIGONOMETRIC FUNCTIONS. 9 Hrs.
6.1 Angles.
6.2 Measurements of angles in different quadrants.
6.3 Degree and radian measurements.
6.4 Trigonometric functions.
6.5 Signs of trigonometric functions.
6.6 Graphical representation of trigonometric functions (Sin, Cos, tan)
6.7 Fundamental identities.
6.8 Problems.

7. TRIGONOMETRIC IDENTITIES. 6 Hrs.
7.1 Fundamental Law and Deductions.
7.2 Sum and Difference Formulae.
7.3 Double angle identities.
7.4 Half angle identities.
7.5 Conversion of Sum or Difference to products.
7.6 Problems.

8. SOLUTION OF TRIANGLES. 6 Hrs.
8.1 Solution of oblique triangles.
8.2 The law of Sines.
8.3 The law of Cosines.
8.4 Solution of right triangles.
8.5 Measurement of heights and distances.
8.6 Problems.

9. VECTORS. 6 Hrs.
9.1 Scalars & Vectors.
9.2 Addition and Subtraction.
9.3 The unit vectors i, j, k.
9.4 Direction Cosines.
9.5 Scalar product of two vectors.
9.6 Vector product of two vectors.

MTF 111 ENGINEERING DRAWING

Total Contact Hours

		T	P	C
Theory	0			
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 meaningfully 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, inscribed 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 to 3-dimensional figures, 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 for a stuffing box
27. Introduction to pictorial drawing
28. Pictorial block
29. Isometric, oblique and perspective projections
30. Isometric scale and isometric drawings of a V-block
31. Pictorial and orthographic drawings of different machine parts
32. Terminology and types of threads
33. Drawing of a square thread single and 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

MTF 121 WORKSHOP PRACTICE

Total Contact 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 instruments and 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 electric and electric drill press
11. Uses of screw pitch gauge for checking number of threads on nuts and bolts
12. Making stud bolts and nuts
13. Practice on riveting
14. Practice of grinding drill bits
15. Practice on sheet metal
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. Practice of using measuring scales in
2. Practice of fixing job, cutting tools on lathe and taking simple cuts
3. Grinding practice of lathe tools
4. Grinding practice of drills
5. Practice of simple and step turning
6. Practice of knurling
7. Practice of drilling reaming on lathe
8. Simple boring practice
9. Taper turning practice by the use of tools post and tail stock
10. Practice of cutting simple screw threads on lathe

11. Practice of cutting internal threads
12. Practice of rapid and plain indexing
13. Indexing practice in spur gear cutting

RECOMMENDED BOOKS

1. Luding, Metal Work
2 R. E. Smith, Forging and Welding Part I,
3. H. D. Burghardt, Machine Tool Operation Part I,

FPPT-133 INTRODUCTION TO FOOD SCIENCE

Total contact hours

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

AIM The student will be able to attain the knowledge of basic food science and technology and visualize the need and importance of subject.

COURSE CONTENTS

1. INTRODUCTION **8 Hours**

1.1 Food Science
1.2 Food Technology
1.3 Food Processing and Preservation
1.4 Differentiation between Food Science and Technology
1.5 Inter-disciplinary relationship
1.6 Career opportunities

2. FOOD SOURCES AND SUPPLY IN PAKISTAN **3 hours**

3. DEVELOPMENTS IN FOOD INDUSTRY **4 hours**

3.1 Food preservation in ancient / prehistoric times
3.2 Developments in other techniques

4. FOOD INDUSTRY IN PAKISTAN **4 hours**

5. SIGNIFICANCE OF FOOD SCIENCE & TECHNOLOGY **4 hours**

5.1 Regulating food supply
5.2 Consumer convenience
5.3 Economic gains

6. FOOD CONSTITUENTS **14 hours**

6.1 Water
6.2 Proteins
6.3 Lipids
6.4 Carbohydrates
6.5 Vitamins
6.6 Minerals
6.7 Other constituents (color, flavor. organic acids, toxicants)

7. CLASSIFICATION OF FOODS **7 hours**

7.1 Based on origin
7.2 Based on perishability
7.3 Based on pH value

8. FOOD SPOILAGE **12 hours**

8.1 Spoilage of stable foods
8.2 Spoilage of semi- perishable foods
8.3 Spoilage of perishable foods
8.4 Spoilage agents
8.5 Spoilage by autolysis

9. SPOILAGE AGENTS **8 hours**

9.1 Enzymes
9.2 Microorganisms
9.3 Factors affecting growth of microorganisms
9.3 Insects, rodents and birds
9.4 Physical factors

FPPT-133 INTRODUCTION TO FOOD SCIENCE

INSTRUCTIONAL OBJECTIVES

On completion of this course, the students will be able to;-

1. UNDERSTAND THE ROLE OF FOOD SCIENCE, TECHNOLOGY AND RELATED DISCIPLINES

1.1 Define Food Science, Food Technology, Food Processing and Preservation

1.2 Differentiate between Food Science and Technology.

1.3 Explain relationship of food science with other disciplines, physics, chemistry, biology, engineering and computer science.

1.4 Explain career opportunities in food industry, food service organizations, teaching institutions, research organizations and other potential openings.

2. KNOW THE FOOD SOURCES AND SUPPLY IN PAKISTAN

2.1 Explain food and its supply in Pakistan

2.2 Food related nutrition and health conditions.

3. UNDERSTAND THE DEVELOPMENTS IN FOOD INDUSTRY

3.1 Describe the developments in food processing and preservation in ancient/ prehistoric/ modern times.

3.2 Describe the developments in techniques like cold storage, freezing, drying and dehydration flour milling, dairy, irradiation etc.

4. KNOW THE FOOD INDUSTRY IN PAKISTAN

Name the location and distribution of the following industry in Pakistan.

Fruit and vegetable processing, Beverage industry, Wheat and grain milling industry, Baking industry, Snack food industry, Vegetable ghee and oil Indus, Sugar industry, Confectionery industry, Dairy industry, Ice cream manufacturing, Meat & poultry processing, Fish processing.

5. UNDERSTAND THE SIGNIFICANCE OF FOOD SCIENCE & TECHNOLOGY

5.1 Describe the significance of food science and technology in regulating food supply

5.2 Explain consumer convenience

5.3 Explain the economic gains to general public and government.

6. UNDERSTAND THE FOOD CONSTITUENTS

6.1 Define water and the nature of water in food.
6.2 Describe the role of water in foods and human body.
6.4 Classify carbohydrates.
6.5 Discuss role of carbohydrates in human nutrition.
6.6 Define proteins and its importance.
6.7 Describe the formation and function of protein.
6.8 Define lipids and its application.
6.9 Explain the application of lipids its nutritional significance
6.10 Describe the classification of vitamins with examples.
6.11 Define vitamins and role of vitamins in human nutrition.
6.13 Describe mineral elements in food and their importance in the body..
6.15 Explain the functions and types of colors.
6.16 What are flavors and state their functions.
6.17 Discuss various flavoring compounds in foods.
6.18 State the role of flavor enhancer in food.
6.19 Differentiate between various aromatic compounds components in foods.
6.20 Describe the nature of organic acids in foods and their functions.
6.21 Discuss toxicants present in food and their effects on the body.

7. UNDERSTAND THE CLASSIFICATION OF FOODS

7.1 List various classes of foods.
7.2 Enumerate classes of foods based on their origin
7.3 Classify food on perishability
7.4 Define stable, semi perishable and perishable foods
7.5 Classify foods on the basis of pH value and explain each category in detail.

8. UNDERSTAND THE SPOILAGE OF FOODS

8.1 Define food deterioration and spoilage
8.2 Describe mode of spoilage of stable, semi perishable and perishable foods.
8.3 Explain autolysis. Give examples of spoilage by autolysis
8.4 Define enzyme. Give its classification and nomenclature.
8.5 Explain the uses of enzymes.
8.6 Describe factors affecting enzyme activity.
8.7 Develop relationship between enzymes and preservation.
8.8 Explain the microbial activities resulting in food spoilage
8.9 Describe how insects, rodents and birds deteriorate foods
8.10 Explain how physical factors cause deteriorative changes in foods.

9. UNDERSTAND CHARACTERISTICS OF SPOILAGE AGENTS

9.1 Enlist food spoilage agents

9.2 State the role of enzyme in food spoilage
9.3 Name the microorganisms associated with food spoilage
9.4 List factors effecting growth of microorganisms.
9.5 Name important pests.

INTRODUCTION TO FOOD SCIENCE

LIST OF PRACTICALS

96 hours

1. Visit to food technology section of a national research institute.
2. Visit to food industry.
3. Visit to a cold storage.
4. Visit to food technology department of a university.
5. Visit to dehydration unit.
6. Visit to nuclear research facility in the region.

FUNDAMENTAL OF FOOD PROCESSING AND PRESERVATION
FPPT 133
Total contact hours

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

AIM The student will be able to understand and use the scientific basis of food Processing and preservation.

1. PRINCIPLES OF FOOD PRESERVATION 5 hours

10.1 Prevention or delay of autolysis
10.2 Prevention or delay of microbial activity
10.3 Control of pest activities
10.4 Reduction in physical defects
10.5 Application of preservation techniques in food industry

2. PREPARATORY OPERATIONS IN FOOD PROCESSING 5 hours

11.1 Handling and transportation of raw materials
11.2 Cleaning
11.3 Sorting and grading
11.4 Peeling, shelling, skinning,
11.5 Removal of inedible constituents
11.6 Size reduction,
11.7 Mixing, filtration,
11.8 Prevention of enzymatic browning

3. USE OF HIGH TEMPERATURE 8 hours

12.1 Cooking
12.2 Blanching
12.3 Pasteurization
12.4 Sterilization and commercial sterilization
12.5 Canning

4. USE OF LOW TEMPERATURE 8 hours

13.1 Equipment and procedure
13.2 Refrigeration systems
13.3 Use of above freezing temperature
13.4 Use of below freezing temperature

5. REMOVAL OR BINDING OF MOISTURE 8 hours

14.1 Role of water in food
14.2 Forms of water in food
14.3 Advantages of dried foods
14.4 Sun drying
14.5 Dehydration
14.6 Evaporation and concentration
14.7 Freeze-drying
14.8 Dehydro-freezing
14.9 Intermediate moisture foods technology

6. USE OF CHEMICAL ADDITIVES **8 hours**

15.1 Definition
15.2 Functions of food additives
15.3 Chemical additives as non preservatives
15.4 Chemical additives as preservatives
15.5 Effectiveness of chemical preservatives
15.6 Food laws

7. USE OF FERMENTATIONS **8 hours**

16.1 Fermented foods
16.2 Objects of fermentation
16.3 Types of fermentation
16.4 Changes in foods

8. USE OF IRRADIATIONS **6 hours**

17.1 Units of measurement
17.2 Characteristics of electromagnetic waves
17.3 Sources of electromagnetic radiations
17.4 Use of ultraviolet radiation
17.5 Use of ionizing radiation
17.6 Commercial application of irradiation
17.7 Effect of irradiation on foods

9. FOOD PACKAGING **8 hours**

18.1 Characteristics of a package
18.2 Packaging materials
18.3 Rigid and flexible metals
18.4 Glass
18.5 Flexible and rigid cellulosics & plastics
18.6 Flexible and rigid paper products
18.7 Laminates and multilayer material
18.8 Protective packaging in tropical environments
18.9 Food labeling

RECOMMENDED BOOKS

1. J.A. Awan, 2005. Food Science and Technology, Unitech Communications, Faisalabad.
2. J.A. Awan, 2007. Food Processing and Preservation, Unitech Communications, Faisalabad.
3. N. N. Potter and J. H. Hotchkiss, 1995. Food Science. The AVI Publishing Co. Inc., Westport, Connecticut.
4. P.M. Gaman and K.B. Shrington, 1981. An introduction to Food Science, Nutrition and Microbiology, Pergman Press, New York.
5. Keith Proudlove, 1991. The Science and Technology of Foods, Forbes Publications, London.

PRACTICAL MANUAL

1. J.A. Awan and S. U. Rehman, 2005. Food Analysis Manual, Unitech Communications, Faisalabad.
2. J.A. Awan and S. U. Rehman, 2004. Food Preservation Manual, Unitech Communications, Faisalabad.

FPPT-133 FUNDAMENTAL OF FOOD PROCESSEING AND PRESERVATION

INSTRUCTIONAL OBJECTIVES

1. UNDERSTAND PRINCIPLES OF FOOD PRESERVATION

10.1 Explain the principle of food preservation by preventing or delaying autolysis.

10.2 Explain the principle of food preservation by preventing or delaying microbial activity.

10.3 Explain the principles of food preservation by preventing or controlling pest activities.

10.4 Explain the principles of food preservation by preventing or reducing Physical defects.

2. UNDERSTAND PREPARATORY OPERATIONS IN FOOD PROCESSING

11.1 Discuss technology of harvesting raw materials.

11.2 Enlist the preparatory operations performed during food processing

11.3 Explain handling and transportation of raw materials

11.4 Explain how cleaning of raw materials take place during processing.

11.5 Describe the categories of sorting and grading of raw materials with example.

11.6 Explain peeling, shelling, skinning and removal of inedible contents of Raw materials take place..

11.7 Discuss size reduction of raw material during processing and its importance in food industry.

11.8 Discuss the mixing unit operation during food processing

11.9 Describe filtration operation in food processing industry.

11.10 Explain how enzymatic browning is prevented through blanching and by use of chemicals.

3. UNDERSTAND USE OF HIGH TEMPERATURE IN FOOD PRESERVATION

12.1 State main objectives of cooking

12.2 Describe blanching

12.3 Describe pasteurization

12.4 Differentiate between pasteurization, sterilization and commercial sterilization.

12.5 Explain the methods of pasteurization and sterilization.

12.6 Describe unit operations in canning.

12.7 Discuss the factors affecting heat processing of food during canning.

4.UNDERSTAND PRESERVATION BY USE OF LOW TEMPERATURE

13.1 State objectives of cooling foods.

13.2 Diagrammatic representation of mechanical refrigeration system
13.3 Explain the use of above freezing temperature
13.4 Explain the principle and procedure of cold storage.
13.5 Discuss the factors affecting cold storage.
13.6 Explain the use of below freezing temperature
13.7 Describe types of freezers and methods of food freezing.
13.8 Explain the effect of low temperature on foods.
13.9 Explain the storage life of frozen foods.
13.10 State the effect of thawing on the quality of frozen foods.
13.11 Discuss the effect of freezing on microorganisms.

5.UNDERSTAND REMOVAL AND BINDING OF MOISTURE FOR FOOD PRESERVATION

14.1 State the functions of water in food
14.2 Describe the methods of sun drying
14.3 Describe dehydration procedures and equipment.
14.4 Discuss special drying techniques.
14.5 Explain evaporation and concentration processes for food preservation
14.6 State procedure for freeze drying
14.7 Explain dehydro freezing
14.8 Describe intermediate moisture foods technology.

6.UNDERSTAND THE APPLICATIONS OF CHEMICAL ADDITIVES

15.1 Differentiate between chemical / food additive, food adulterant and food contaminant.
15.2 Explain the use of chemical additives for non preservative applications.
15.3 Explain the use of chemical additives for preservation of foods.
15.4 Explain the factors affecting the effectiveness of chemical preservatives.
15.5 Discuss how food laws aim in setting guidelines for the quality of processed foods.

7.UNDERSTAND THE USE OF FERMENTATION FOF PRESERVATION

16.1 Define fermentation
16.2 List important fermented foods
16.3 Explain objectives of fermentation
16.4 List types of fermentations
16.5 Describe the use of alcoholic fermentations and its use in industry
16.6 Describe the production of vinegar by fermentation
16.7 Describe the use of lactic acid fermentations in industry
16.7 Explain the changes caused by desirable fermentations in foods.

8. UNDERSTAND THE USE OF IRRADIATIONS

17.1 List the units of irradiation measurement
17.2 Describe the characteristics of electromagnetic waves.
17.3 Explain the sources of electromagnetic radiation.
17.4 Describe the use of ultraviolet and ionizing radiation in food preservation.
17.5 Discuss the commercial applications of irradiation.
17.6 Explain the effect of irradiation of foods.

9. UNDERSTAND FOOD PACKAGING

18.1 Define packing and packaging
18.2 Differentiate between packing and packaging
18.3 Explain reasons of packing foods
18.4 Enlist important characteristics of a package
18.5 Enlist types of packaging materials
18.6 Identify and explain conventional packaging materials
18.7 Identify and explain modern packaging materials
18.8 Define aseptic packaging
18.9 Explain the manufacture of aseptic packaging paper.
18.10 Explain the working of aseptic filling machine (Tetra Pack)
18.11 Classify into rigid and flexible
18.12 Explain principle of package design
18.13 Enlist the information considered mandatory to appear on the label of prepared food.
18.14 Describe the characteristics and properties of rigid and flexible metals used as food packaging material.
18.15 Discuss advantages and disadvantages of flexible metal contents in food packaging.

FUNDAMENTALS OF FOOD PROCESSING AND PRESERVATION

LIST OF PRACTICALS — 96 hours

1- State the mode of food spoilage
2- Study the spoilage of foods by enzymes
3- Study the pasteurization of milk
4- Canning of some typical fruits
5- Canning of some seasonal vegetables
6- Cold storages of some fruits and vegetables
7- Freezing of difficult vegetables
8- Sun-drying of some fruits
9- Sun- drying of some vegetables
10- Dehydration of some fruits
11- Dehydration of selected vegetables
12- Use of evaporation for concentrating milk
13- Preservation of fruit juice by the use of chemical additives
14- Production of bread by alcoholic fermentation
15- Preservation of fruits by lactic acid fermentation

اسلامیات / مطالعہ پاکستان

مضمون (سال دوئم)	GEN 211	ڈی	پی	سی
حصہ اول اسلامیات		1	0	1
حصہ دوم مطالعہ پاکستان		کل وقت: 20 گھنٹے		

موضوعات

1- سورۃ المومنون آیت ۱ تا ۱۱ مع ترجمہ

2- دس منتخب احادیث مع ترجمہ و تشریح

☆ خیارکم من تعلم القرآن وعلمہ

☆ لا ایمان لمن لا امانۃ لہ ولا دین لمن لا عہد لہ

☆ وایاکم والظن فان الظن اکذب الحدیث

☆ من احدث فی امرنا ہذا ما لیس منہ فہو رد

☆ من حمل علینا السلاح فلیس منا

☆ انا وکافل الیتیم فی الجنۃ

☆ لا ضرر ولا ضرار فی الاسلام

☆ کلکم راع وکلکم راع وکلکم مسئول عن رعیتہ

3- سیرۃ طیبہ

☆ مکی زندگی۔ دارارقم۔ حبشہ۔ ہجرت

☆ مدنی زندگی۔ مواخات۔ میثاق مدینہ۔ غزوہ بدر (اسباب و نتائج)

4- حضور ﷺ بحیثیت

☆ خطیب خطبہ حجۃ الوداع

معلم کامل، سربراہ خاندان

5- اسلامی معاشرہ

نظام تعلیم اور اس کے مقاصد۔ عدل و انصاف۔ امر بالمعروف۔ نہی عن المنکر

جہاد۔ کسب حلال۔ سچ (اہمیت و فضیلت)

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

اسلامیات

تدریس مقاصد

عمومی مقاصد بطالبعلم 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 بیان کر سکے
☆ قرآنی آیات کی تشریح کر سکے
☆ 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 نبویہ

☆ عمومی مقصد احادیث کی روشنی میں اسلامی اخلاقی اقدار (انفرادی و اجتماعی) 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
☆ ان احادیث کی دی گئی تعلیمات کے مطابق اپنی زندگی گزار سکے

سیرت طیبہ

☆ عمومی مقصد: حضور ﷺ کی سیرت طیبہ کے بارے میں جان سکے

خصوصی مقاصد:

☆ حضور ﷺ کی ابتدائی زندگی اختصار کے ساتھ بیان کر سکے
☆ حضور ﷺ کی ہجرت کا واقع بیان کر سکے
☆ حضور ﷺ کی مدنی زندگی اختصار سے بیان کر سکے
☆ حضور ﷺ کی بطور معلم خصوصیات بیان کر سکے

☆ حضور ﷺ کی بطور سربراہ خاندان بیان کر سکے

اسلامی معاشرہ

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

خصوصی مقاصد:

☆ اسلامی معاشرہ کا معنی و مفہوم بیان کر سکے

☆ اسلامی معاشرہ کی امتیازی خصوصیات بیان کر سکے

☆ اسلامی معاشرہ میں عدل و احسان کی اہمیت بیان کر سکے

☆ تبلیغ کے لغوی معنی بیان کر سکے

☆ تبلیغ کی اہمیت و ضرورت بیان کر سکے

☆ جہاد کے لفظی و اصطلاحی معنی بیان کر سکے

☆ جہاد کی اہمیت بیان کر سکے

☆ جہاد اور قتال میں فرق بیان کر سکے

☆ جہاد کی مختلف اقسام بیان کر سکے

☆ لفظ مسجد کی تعریف کر سکے

مسجد کی سابقہ حیثیت کو بحال کرنے کے بارہ میں اقدامات کو بیان سکے

اسلامی ریاست

عمومی مقاصد۔ اسلامی ریاست کی خصوصیت 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 و مقاصد بیان کر سکے

☆ اسلامی ریاست کے قیام کیلئے جدوجہد کر سکے

نصاب مطالعہ پاکستان

ٹی	پی	سی
1	0	1

کل وقت: 12 گھنٹے

سال دوم

حصہ دوم

موضوعات

- ☆ دو قومی نظریہ
- ☆ تحریک پاکستان
- ☆ انڈین کانگریس
- ☆ مسلم لیگ
- ☆ تقسیم بنگال
- ☆ میثاق لکھنؤ
- ☆ تحریک خلافت
- ☆ سندھ تحریک
- ☆ تجاویز رضی
- ☆ نہرو رپورٹ
- ☆ قائداعظم کے چودہ نکات
- ☆ خطبہ الہ آباد
- ☆ انتخابات 1936 اور انتخابی منشور
- ☆ قرارداد پاکستان

حصہ دوم

مطالعہ پاکستان

تدریس مقاصد

تحریک پاکستان

عمومی مقصد: قیام پاکستان کے اسباب و محرکات کو بیان کر سکے

خصوصی مقاصد:

- ☆ قومیت کے مفہوم کو بیان کر سکے
- ☆ دو قومی نظریہ کی تعریف و توضیح کر سکے
- ☆ دو قومی نظریہ اہمیت بیان کر سکے
- ☆ ہندوستانی مسلمانوں کی محرومیوں کو بیان کر سکے
- ☆ قومی تشخص کو بحال رکھنے کے لئے مسلمانان ہند کی مساعی بیان کر سکے
- ☆ آزادی ہند اور قیام پاکستان علامہ اقبال اور قائداعظم کی مساعی بیان کر سکے
- ☆ قیام پاکستان سے مستقبل اسلامی مملکت کے قیام کے لئے مسلم عوام کی کوششوں کو بیان کر سکے
- ☆ مسلم لیگ کے قیام پاکستان کے لئے جدوجہد بیان کر سکے

(غیر مسلم طلباء کے لئے)

نصاب اخلاقیات	ٹی	پی	سی
سال دوم	1	0	1

کل وقت: 20 گھنٹے

موضوعات

معاشرتی اقدار، خاندان، قوم، قومی سطح، شہری سطح، صنعتی اداروں کی سطح، ضروریات، ورثہ

- ☆ حقوق و فرائض
- ☆ قوت برداشت
- ☆ قوت ارادی
- ☆ لگن و جذبہ
- ☆ وسیع النظری
- ☆ بے غرضی
- ☆ مثالی دوستی
- ☆ حفاظتی شعور
- ☆ پاس آزادی
- ☆ کامل اتحاد
- ☆ تغیرات کو قبول کرنا
- ☆ خود شناسی

نصاب اخلاقیات

سال دوم

تدریس مقاصد

عمومی مقاصد :

طالب علم: اخلاقیات کی اہمیت و ضرورت 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 مثبت اثرات پیدا کرنے کے طریقے بیان کر سکے

☆ اعلیٰ اخلاقی اقدار میں سے

قوت برداشت۔ قوت ارادی۔ لگن جذبہ۔ وسیع النظری۔ بے غرضی۔ انسانی دوستی حفاظتی۔ شعور۔ پسند آزادی۔

کامل اکائی اور خدا شناسی کی اہمیت بیان کر سکے

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

MGM 221 BUSINESS MANAGEMENT AND INDUSTRIAL ECONOMICS

Total Contact Hours

		T	P	C
Theory	32			
Practical	0	1	0	1

AIMS The students will be able to develop management skills, get acquainted the learner with the principles of management and economic relations and develop commercial/economic approach to solve the problems in the industrial set-up.

COURSE CONTENTS

1. ECONOMICS **2 Hours**

1.1 Definition: Adam Smith, Alfred Marshall, Prof. Robins.
1.2 Nature and scope
1.3 Importance for technicians.

2. BASIC CONCEPTS OF ECONOMICS **1 Hour**

2.1 Utility
2.2 Income
2.3 Wealth
2.4 Saving
2.5 Investment
2.6 Value.

3. DEMAND AND SUPPLY. **2 Hours**

3.1 Definition of demand.
3.2 Law of demand.
3.3 Definition of supply.
3.4 Law of supply.

4. FACTORS OF PRODUCTION. **2 Hours**

4.1 Land
4.2 Labour
4.3 Capital
4.4 Organization.

5. BUSINESS ORGANIZATION. **3 Hours**

5.1 Sole proprietorship.
5.2 Partnership
5.3 Joint stock company.

6. ENTREPRENEURIAL SKILLS **4 Hours**

6.1 Preparing, planning, establishing, managing, operating and evaluating relevant resources in small business.

6.2 Business opportunities, goal setting.
6.3 Organizing, evaluating and analyzing opportunity and risk tasks.

7. SCALE OF PRODUCTION. 2 Hours

7.1 Meaning and its determination.
7.2 Large scale production.
7.3 Small scale production.

8. ECONOMIC SYSTEM 3 Hours

8.1 Free economic system.
8.2 Centrally planned economy.
8.3 Mixed economic system.

9. MONEY. 1 Hour

9.1 Barter system and its inconveniences.
9.2 Definition of money and its functions.

10. BANK. 1 Hour

10.1 Definition
10.2 Functions of a commercial bank.
10.3 Central bank and its functions.

11. CHEQUE 1 Hour

11.1 Definition
11.2 Characteristics and kinds of cheque.
11.3 Dishonour of cheque.

12. FINANCIAL INSTITUTIONS 2 Hours

12.1 IMF
12.2 IDBP
12.3 PIDC

13. TRADE UNION 2 Hours

13.1 Introduction and brief history.
13.2 Objectives, merits and demerits.
13.3 Problems of industrial labour.

14. INTERNATIONAL TRADE. 2 Hours

14.1 Introduction
14.2 Advantages and disadvantages.

15. MANAGEMENT 1 Hour

15.1 Meaning
15.2 Functions

16. ADVERTISEMENT **2 Hours**

16.1 The concept, benefits and draw-backs.
16.2 Principal media used in business world.

17. ECONOMY OF PAKISTAN **1 Hour**

17.1 Introduction
17.2 Economic problems and remedies.

BOOKS RECOMMENDED

1. Nisar-ud-Din, Business Organization, Aziz Publisher, Lahore
2. M. Saeed Nasir,Introduction to Business, Ilmi Kitab Khana, Lahore.
3. S.M. Akhtar, An Introduction to Modern Economics, United Limited, Lahore.

MGM-221 BUSINESS MANAGEMENT AND INDUSTRIAL ECONOMICS.

INSTRUCTIONAL OBJECTIVES

1. UNDERSTAND THE IMPORTANCE OF ECONOMICS.

1.1 State definition of economics given by Adam Smith, Alfred Marshall and Professor Robins.
1.2 Explain nature and scope of economics.
1.3 Describe importance of study of economics for technicians.

2. UNDERSTAND BASIC TERMS USED IN ECONOMICS.

2.1 Define basic terms, utility, income, wealth, saving, investment and value.
2.2 Explain the basic terms with examples

3. UNDERSTAND LAW OF DEMAND AND LAW OF SUPPLY.

3.1 Define Demand.
3.2 Explain law of demand with the help of schedule and diagram.
3.3 State assumptions and limitation of law of demand.
3.4 Define Supply.
3.5 Explain law of Supply with the help of schedule and diagram.
3.6 State assumptions and limitation of law of supply.

4. UNDERSTAND THE FACTORS OF PRODUCTION

4.1 Define the four factors of production.
4.2 Explain labour and its features.
4.3 Describe capital and its peculiarities.

5. UNDERSTAND FORMS OF BUSINESS ORGANIZATION.

5.1 Describe sole proprietorship, its merits and demerits.
5.2 Explain partnership, its advantages and disadvantages.
5.3 Describe joint stock company, its merits and demerits.
5.4 Distinguish public limited company and private limited company.

6. UNDERSTAND ENTERPRENEURIAL SKILLS

6.1 Explain preparing, planning, establishing and managing small business set up
6.2 Explain evaluating all relevant resources
6.3 Describe organizing analyzing and innovation of risk of task

7. UNDERSTAND SCALE OF PRODUCTION.

7.1 Explain scale of production and its determination.
7.2 Describe large scale production and it merits.
7.3 Explain small scale of production and its advantages and disadvantages.

8. UNDERSTAND DIFFERENT ECONOMIC SYSTEMS.

8.1 Describe free economic system and its characteristics.
8.2 Explain centrally planned economic system, its merits and demerits.
8.3 State mixed economic system and its features.

9. UNDERSTAND WHAT IS MONEY

9.1 Define money
9.2 Explain barter system and its inconveniences.
9.3 Explain functions of money.

10. UNDERSTAND BANK AND ITS FUNCTIONS.

10.1 Define bank.
10.2 Describe commercial bank and its functions.
10.3 State central bank and its functions.

11. UNDERSTAND CHEQUE AND DISHONOR OF CHEQUE.

11.1 Define cheque.
11.2 Enlist the characteristics of cheque.
11.3 Identify the kinds of cheque.
11.4 Describe the causes of dishonor of a cheque.

12. UNDERSTAND FINANCIAL INSTITUTIONS.

12.1 Explain IMF and its objectives.
12.2 Explain organisational set up and objectives of IDBP.
12.3 Explain organisational set up and objectives of PIDC.

13. UNDERSTAND TRADE UNION, ITS BACKGROUND AND FUNCTIONS.

13.1 Describe brief history of trade union.
13.2 State functions of trade union.
13.3 Explain objectives, merits and demerits of trade unions.
13.4 Enlist problems of industrial labour.

14. UNDERSTAND INTERNATIONAL TRADE.

14.1 Explain international trade.
14.2 Enlist its merits and demerits.

15. UNDERSTAND MANAGEMENT

15.1 Explain meaning of management.
15.2 Describe functions of management.
15.3 Identify the problems of business management.

16. UNDERSTAND ADVERTISEMENT.

16.1 Explain the concept of advertisement.
16.2 Enlist benefits and drawbacks of advertisement.
16.3 Describe principal media of advertisement used in business world.

17. UNDERSTAND THE ECONOMIC PROBLEMS OF PAKISTAN.

17.1 Describe economy of Pakistan.
17.2 Explain economic problems of Pakistan
17.3 Explain remedial measures for economic problems of Pakistan.

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. Thomas Finny, Calculus and Analytic Geometry
2. Ghulam Yasin Minhas, Technical Mathematics Vol - I & II, Ilmi Kitab Khana, Lahore.
3. Riaz Ali Khan, Polytechnic Mathematic Series Vol I & II, Majeed Sons, Faisalabad
4. Sana Ullah Bhatti, Calculus and Analytic Geometry, Punjab Text Book Board, Lahore.

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

FPPT 213 FRUIT AND VEGETABLE PROCESSING TECHNOLOGY

Total Contact Hours

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

AIM: At the end of the course, the students will be able to understand the technology involved in food and vegetable processing industry

1 INTRODUCTION 6 hours

1.1 History and growth of fruits and vegetable
1.2 Physical properties of fruit and vegetables
1.3 Post harvest handling and changes
1.4 Types of storage
1.5 Composition and nutritional value
1.6 Introduction to fruit and vegetable processing industry
1.7 Texture of fruit and vegetable

2. PREPARATORY OPERATIONS 12 hours

2.1 Preparatory operations
2.2 Receiving
2.3 Washing
2.4 Sorting, grading, and suitability
2.5 Size reduction
2.6 Blanching
2.7 Sulphiting / sulphuring
2.8 Extraction
2.9 Pulping
2.10 Sedimentation
2.11 Crystallization

3. PROCESSING 14 hours

3.1 Canning
3.2 Dehydration
3.3 Pickling
3.4 Preserving by Irradiation
3.5 Freeze dehydration (Lyophilization)

4. PRODUCTS 12 hours

4.1 Beverages
4.2 Preserves
4.3 Sauces
4.4 Pickles
4.5 Soups

5. SPOILAGE **6 hours**

5.1 Processed fruits
5.2 Processed vegetables
5.3 Chemical changes

6. NUTRITION OF PROCESSED FOODS **2 hours**

7. RECENT TRENDS **8 hours**

7.1 Functional foods
7.2 Manufacturing
7.3 Introduction to Neutraceuticals

8. QUALITY CONTROL **2 hours**

8.1 Product quality

9. HYGIENE AND SANITATION **2 hours**

9.1 Personal hygiene
9.2 Plant sanitation
9.3 Waste management

RECOMMENDED BOOKS

1. J.A Awan, 2007. Food Processing and Preservation, Unitech Communication, Faislabad
2. L. Gindhari, G.S. Siddappa and G.L. Tandon, 1998. Preservation of Fruits and Vegetables. Publications and Information Division, Indian Council of Agricultural Research, New Dehli.
3. B.D. Micea, 1995. Fruit and Vegetable Processing. FAO Bulletin No. 199, FAO Rome.
4. J.A. Awan and S. U. Rehman, 2005. Food Analysis Manual, Unitech Communications, Faisalabad.
5. J.A. Awan and S. U. Rehman, 2004. Food Preservation Manual, Unitech Communications, Faisalabad.
6. J.G. Woodroof and B.S. Luh, 1975. Commercial Fruit Processing. AVI Publishing Company, Westport Connecticut.
7. B.S. Luh and J.G. Woodroof, 1982. Commercial Vegetable Processing. AVI Publishing Company, Westport Connecticut.

FOOD AND VEGETABLE PROCESSING TECHNOLOGY

INSTRUCTIONAL OBJECTIVES

At the end of the course,student will be able to

1. **UNDERSATND THE HISTORY AND GROWTH OF SELECTED FRUITS AND VEGETABLES.**

   1.1 describe the physical properties of selected fruits
   1.2 Describe the physical properties of selected vegetables.
   1.3 Describe the post harvest handling and changes of fruits and vegetables.
   1.4 Describe the different types of storage of fruits and vegetables
   1.5 Describe the composition and nutritional value of fruits and vegetables
   1.6 Describe the present status of fruits and vegetable industry in the country
   1.7 Define texture.
   1.8 Describe the texture of fruits and vegetables.

2. **UNDERSTAND THE PREPARATORY OPERATIONS OF FRUITS AND VEGETABLE**

   2.1 Describe the importance of preparatory operations in the processing of fruits and vegetable.
   2.2 Enlist different preparatory operations
   2.3 Describe factors to be considered in the receiving of fruits and vegetable
   2.4 Describe the need for washing fruits and vegetable
   2.5 Enlist parameters for sorting and grading of fruits and vegetables
   2.6 Define size reduction
   2.7 Describe the importance of size reduction
   2.8 Define the blanching
   2.9 Describe the objectives and methods of blanching
   2.10 Describe the need for sulphiting
   2.11 Understand the extraction and pulping
   2.12 Differentiate between extraction and pulping
   2.13 Explain the sedimentation
   2.14 Define crystallization.

3. **UNDERSTAND THE PROCESSING OF FRUITS AND VEGETABLE**

   3.1 define canning
   3.2 Describe the history of canned food.
   3.3 Describe the unit operations in the canning of fruits and vegetables.
   3.4 Define dehydration describe the methos of dehydration

3.5 Describe the advantage of dehydration
3.6 Define pickling
3.7 Describe the method of pickling
3.8 Define irradiation
3.9 Effect of irradiation on fruits and vegetables
3.10 Define freeze dehydration
3.11 Describe the method and advantage of freeze dehydration in fruits and vegetables

4. UNDERSTAND THE PRODUCTS OF FRUITS AND VEGETABLE

4.1 define beverages
4.2 describe the different types of beverages
4.3 describe the nutritional value of different beverages
4.4 define preserves
4.5 describe the preparation of different preserves
4.6 define sauces
4.7 describe the preparation of different pickels
4.8 define soups
4.9 describe the use of soups in our diet

5. UNDERSTAND THE SPOILAGE OF FRUITS AND VEGETABLE

5.1 describe the spoilage of processed fruits
5.2 Describe the factors involved in the spoilage of processed fruits.
5.3 Describe factors involved in the spoilage of vegetables
5.4 Describe chemical changes occurring in processed fruits and vegetables

6. UNDERSTAND THE NUTRITION OF PROCESSED FRUITS AND VEGETABLES

6.1 Describe the importance of nutritional value of processed fruits and vegetables
6.2 Describe the nutritional value of selected processed fruits and vegetables.

7. UNDERSTAND THE RECENT TRENDS

7.1 Define the functional foods.
7.2 Describe different types of functional foods
7.3 Describe the manufacturing of functional foods
7.4 Define neutraceuticals

8. UNDERSTAND THE QUALITY CONTROL

8.1 define quality and quality control
8.2 Describe the importance of quality controlling the product quality
8.3 Describe the techniques for controlling of products quality.

9. UNDERSTAND THE HYGEINE AND SANITATION

9.1define hygiene and sanitation
9.2 define personal hygiene
9.3 describe the application of personal hygiene in the food industry.
9.4 define plant sanitation
9.5 describe the importance of plant sanitation ini food industry.
9.6 describe how waste management helps in maintaining good sanitation in the food.

FPPT 213 FRUITS AND VEGETABLE PROCESSING TECHNOLOGY 96 Hours

LIST OF PRACTICALS:

1. Blanching of apples
2. Blanching of leafy vegetables
3. Pulping of mango
4. Canning of apples
5. Canning of peas
6. Preparation of apple jam
7. Preparation of orange marmalade
8. Visit to beverage plant
9. Preparation of mango juice
10. Preparation of lychee juice
11. Preparation of selected fruits.
12. Drying of seasonal vegetables
13. Preparation of mango pickels
14. Visit to nuclear research facility for purpose of fruits preservation

FPPT 223 CEREAL and BAKING TECHNOLOGY

Total Contact Hours

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

AIM: At the end of the course the students will be able to understand the technology involved in the processing of cereals.

COURSE CONTENTS

1. INTRODUCTION **4 hours**

1.1 History and growth.
1.2 Importance and production of cereal grains.
1.3 Structure and composition of wheat grain.
1.4 Structure and composition of rice grain.
1.5 Structure and composition of maize grain.
1.6 Grades and grading of Grains.

2. STORAGE OF CEREALS **4 hours**

2.1 Types of storage.
2.2 Role of moisture.
2.3 Functional changes.

3. WHEAT MILLING **20 hours**

3.1 Dry milling.
3.2 Handling.
3.3 Storage.
3.4 Blending.
3.5 Cleaning.
3.6 Tempering.
3.7 Conditioning.
3.8 Removal of impurities.
3.9 Grinding process.
3.10 Types of grinding machines.
3.11 Extraction rates of flour.
3.12 Operation of roller mill.
3.13 Grinding system.
3.14 Reduction and tailings.
3.15 Sieving process.
3.16 Purification process.
3.17 Flour handling and storage.

4. AIR CLASSIFICATION AND FINE GRINDING 8 hours

4.1 Whole wheat products.
4.2 Milling of soft and durum wheats..
4.3 Developments in milling of cereal grains.

5. RICE MILLING 6 hours

5.1 Par boiling process.
5.2 Dry and wet milling of rice.

6. MAZE PROCESSING

8 hours

6.1 Milling of corn
6.2 Production of starch.
6.3 Production of oil.
6.4 Production of gluten.

7. BREAD

8 hours

7.1Types and formulation.
7.2 Ingredients.
7.3 Yeast function.
7.4 Bread making processes.
7.5 Baking process.

8. OTHER BAKED PRODUCTS TECHNOLOGIES 6 hours

8.1 Biscuits, cookies and crackers.
8.2 Cakes.
8.3 Wafers.
8.4 Extrusion technology

BOOKS RECOMMENDED:

1- R.C. Hoseney, 1994. Principles of Cereal Science and Technology. American Association Cereal Chemists Inc., St. Paul, Minnesota.
2- N.L. Kent and A.D. Evers, 1994. Technology of Cereals, Pergamon Press, London.
3- AACC 2000. Approved Methods of American Association of Cereal Chemists. American Association of Cereal Chemists, Inc., St. Paul, Minnesota
4- W.J. Sultan, Practical Baking, AVI, Westport
5- E.S. Posner and A.N. Hibb, 1997. Wheat Flour Milling AACC Inc. St. Paul, Minnesota.
6- E.J. Pyler, 1988. Baking Science and Technology, Sosland Pub. Company, Kansas.
7- S.P. Covensy Linda, 1998. Technology of Bread Making. Blackie Academic & Professional, London.
8- N. Almond, 1988. Biscuits Cookies and Crackers. Elsevier Applied Science, New York.

CEREAL PROCESSING TECHNOLOGY FPPT-223

INSTRUTIONAL OBJECTIVES

At the end of course ,student will be able to

1. **DESCRIBE THE FUNDAMENTALS OF CEREALS**

   1.1describe history,growth and importance of cereal grains.
   1.2 explain structure and composition of wheat grain
   1.3 describe structure and composititon of rice grain
   1.4 explain structure and composition of maize grain.
   1.5 describe grades and grading of cereal grains.

2. **DESCRIBE STORAGE OF CEREALS,ROLE OF MOISTURE AND FUNCTIONAL CHANGES DURING STORAGE.**

   2.1 enlist and describe types of storage for cereals.
   2.2 State role of moisture during storage of cereals
   2.3 Explain functional changes in cereals during storage.

3. **EXPLAIN WHEAMILLINGPROCESS, SIEVING/PURIFICATION PROCESS AND FLOUR HANDLING.**

   3.1 state dry milling of wheat.
   3.2 Explain handling,storage,blending and cleaning of wheat for milling. Being used in wheat milling.

   3.3 Differentiate between tempering and conditioning of wheat grains.
   3.4 Explain grinding process and types of grinding machines
   3.5 Describe extraction rates of flour.
   3.6 State operation of roller mill.
   3.7 Define and explain grinding systems,reduction and tailings of wheat.
   3.8 Describe sieving and purification process of wheat.
   3.9 Explain handling and storage of flour.

4. DESCRIBE WHEAT MILLED PRODUCTS,MILLING OF WHEAT,CORN,RICE AND DEVELOPMENTS IN MILLING OF CEREALS

4.1 Enlist whole wheat products.
4.2 Explain milling of soft and durum wheat
4.3 Describe recent developments in milling of cereals grains

5. DESCRIBE PAR BOILING AND MILLING OF RICE

5.1 state par boiling process
5.2 Describe dry and wet milling of rice.

6. DESCRIBE PRODUCTS OF MAIZE PROCESSING.

6.1 Define milling of corn.
6.2 Explain production of starch from maize
6.3 Describe extraction of oil from maize germ.
6.4 Describe production of gluten from maize.

7. DESCRIBE TYPE, FORMULATION AND BREAD MANUFACTURING PROCESS.

7.1 Enlist types of bread and describe their formulation/recipe.
7.2 Explain ingredients of bread and their functions.
7.3 Describe bread processing
7.4 Describe baking process in detail.

8. EXPLAIN TECHNOLOGY OF BAKED PRODUCTS, PASTA, NOODLES AND EXTRUSION PRODUCTS.

8.1 Describe technology of biscuits, cookies and crackers.
8.2 Define and explain cakes and wafers.
8.3 Describe the technology of extruded products.

FPPT 223 CEREAL AND BAKING TECHNOLOGY

LIST OF PRACTICALS **96 Hours**

1 Fat and solids determination in cereals.
2 Determination of pH, moisture, fiber and nitrogen in cereals.
3 Visit to a flour mill.
4 Visit to modern rice mill.
5 Manufacture of leavened bread.
6 Baking of biscuits.
7 Determination of wet and dry gluten.
8 Manufacture of a drum dried cereal.
9 Preparation of composite flour.
10 Visit to a baking industry.
11 Determination of test weight .
12 Preparation and sensory evaluation of cakes and cookies.
13 Preparation of Vermicelli.
14 Grading of Grains.
15 Demonstration of Flour Quality .
16 Determination of Moisture in Flour.
17 Determination of Protein in Flour.
18 Determination of pH and Ash in Flour.

FPPT 233 DAIRY PROCESSING TECHNOLOGY

Total Contact Hours

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

AIM: At the end of the course the students will be able to understand the technology involved in the processing of milk.

COURSE CONTENTS

1. INDTRODUCTION **4 hours**

1.1 Dairy industry in Pakistan
1.2 History and growth of dairy industry
1.3 Production of milk in Pakistan

2. MILK SOURCES

2 hours

2.1Sources
2.2Production
2.3Handling
2.4Distribution
2.5Composition

3. DAIRY INDUSTRY IN PAKISTAN **4 hours**

3.1 Method of procurement
3.2 Collection and Reception
3.3 Transportation

4. MILK PROCESSING **10 hours**

4.1 Cream separation
4.2 Standardization
4.3 Homogenization
4.4 Pasteurization
4.5 UHT Technology
4.6 HTST Technology
4.7 Condensation
4.8 Unit operations in milk processing
4.9 Packaging
4.10 Recent advances

5. MILK PRODUCTS TECHNOLOGY **6 hours**

5.1 Flavored milk
5.2 Evaporated milk

5.3 Powdered milk
5.4 Butter
5.5 Yoghurt
5.6 Cheese
5.7 Ice Cream
5.8 Khoya

6. PROPERTIES OF MILK 2 hours

6.1 Physical and Chemical properties of fresh milk
6.2 Physical and Chemical properties of processed milk

7 CHEESE PROCESSING 6 hours

7.1 Classification, Composition and chemistry of cheese
7.2 Processing of cheddar, cottage, soft and Roquefort cheese
7.3 Quality control in cheese making
7.4 Discuss recent advances in cheese processing
7.5 Packaging

8. CREAM AND ALLIED PRODUCTS PROCESSING 6 hours

8.1 Classification and chemical composition of various types of creams
8.2 Unit operations in processing of creams
8.3 Quality control to reduce spoilage
8.4 Recent advances in cream processing

9. YOGHURT 6 hours

9.1 Chemistry and Microbiology of yoghurt
9.2 Production of plain, fruit, frozen and flavored yoghurts
9.3 Unit operations in processing of yoghurt
9.4 Recent advances in yoghurt processing

10. BUTTER 6 hours

10.1 Composition
10.2 Processing of butter
10.3 Evaluation of keeping quality

11. FROZEN MILK PRODUCTS AND ICE CREAM 6 hours

11.1 Classification
11.2 Composition
11.3 Chemical nature
11.4 Flavouring agents
11.5 Additives
11.6 Processing of ice creams
11.7 Recent advances in ice cream processing technology

12. MILK BY-PRODUCTS **2 hours**

12.1 Utilization of whey, casein and butter milk

13. GENERAL **4 hours**

13.1 Quality control
13.2 Packaging – faults, causes and remedies
13.3 Plant hygiene and sanitation

BOOKS RECOMMENDED:

1. W.J. Harper and C.W. Hall, Dairy Technology and Engineering, AVI, Westport.
2. ALFA-LAVAL Dairy Handbook. Alfa-Laval Publications, Sweden.
3. Y.H. Hui, 1993. Dairy Science and Technology Handbpook. VCH Publishers Inc., New York.
4. A.P.H.A. 1993. Standard Methods for the Examination of Dairy Products. Port City Press, Baltimore.
5. A.H. Varnam and J.P. Sutherland, 1994. Milk and Milk Products: Technology Chemistry and Microbiology. Chapman and Hall, London.
6. P.F. Fox, T.P. Guinee, T.M. Cogon and P.L.H. McSweeney, 2000. Fundamentals of Cheese Science. Chapman and Hall, London.
7. A.Y. Tamime and R.K. Robinson, 1985. Yoghurt Science and Technology. Pergamon Press, Oxford.

DAIRY PROCESSING TECHNOLOGY

INSTRUCTIONAL OBJECTIVES FPPT-233

1. UNDERSTAND THE HISTORY AND GROWTH

1.1 explain dairy industry in Pakistan
1.2 describe history and growth of dairy industry
1.3 explain production of milk in Pakistan

2. UNDERSTAND ABOUT MILK SOURCES

2.1 explain sources of milk
2.2 describe production and handling of milk
2.3 explain distribution of milk
2.4 describe the composition of milk

3. UNDERSTAND DAIRY INDUSTRY IN PAKISTAN

3.1 what is milk procurement and explain methods of procurement
3.2 describe collection and reception of milk
3.3 explain transportation of milk

4. EXPLAIN THE MILK PROCESSING

4.1 explain the separation process of milk
4.2 describe the standardization of milk
4.3 define and explain the homogenization of milk
4.4 describe the pasteurization of milk
4.5 enlist and describe the types of UHT milk
4.6 define and explain the condensation process
4.7 describe the unit operation involved in milk processing

4.8 define and explain the tetrapack milk packaging
4.9 describe the recent developments in milk processing

5. EXPLAIN MILK PRODUCTS TECHNOLOGY

5.1 define and explain the procedure of flavoured milk
5.2 define and explain the procedure of evaporate milk
5.3 define and explain the procedure of milk powder
5.4 define and explain the procedure of butter
5.5 define and explain the procedure of yoghurt
5.6 define and explain the procedure of ice ceream
5.7 define and explain the procedure of cheese
5.8 define and explain the procedure of khoya

6. DESCRIBE PROPERTIES OF MILK

6.1 describe the physical and chemical properties of fresh milk
6.2 Describe the physical and chemical properties of processed milk.

7. EXPLAIN CHEESE PROCESSING

7.1 explain the classification of cheese
7.2 describe the composition and chemistry of cheese
7.3 enlist the types of cheese and there major differences and describe processing of major types
7.4 explain the role of quality control in chese processing
7.5 discuss recent development in cheese processing

8. DESCRIBE CREAM AND ALLIED PRODUCTS PROCESSING

8.1 describe the classification,chemical composition of various types of cream
8.2 describe the unit operation involved in processing of cream.
8.3 Explain the role of quality control to reduce the spoilage
8.4 Discuss the recent development in cream processing

9. YOGHURT PROCESSING

9.1 define yoghurt and explain the chemistry and microbiological aspects
9.2 enlist types of yoghurt and describe their production
9.3 describe the unit operations involved in yoghurt processing
9.4 discuss recent development in yoghurt processing

10. DESCRIBE BUTTER PROCESSING

10.1 explain the composition of butter
10.2 explain the processing of butter
10.3 explain the role of quality control in keeping quality

11. FROZEN MILK PRODUCTS AND ICE CREAM

11.1 explain the classification of frozen products.
11.2 Describe the composition and chemical nature of ice cream
11.3 Describe the use of flavouring agents in frozen products

11.4 Enlist all additives use in frozen products and their significance.
11.5 Explain the unit operation involve in frozen products processing
11.6 Discuss the recent advances.

12. MILK BY PRODUCTS

12.1 Discuss the utilization of whey,casein and butter milk.

13. UNDERSTAND THE GENERAL ISSUES IN DAIRY PROCESSING

13.1 Discuss the overall quality issues
13.2 Discuss the faults, causes and remedies of packaging.
13.3 Discuss the dairy plant hygiene and sanitation.

FPPT 233 DAIRY PROCESSING TECHNOLOGY

LIST OF PRACTICALS 96 hours

1. Visit to a dairy farm
2. Visit to a milk processing plant
3. solids not fat(SNF) determination in milk
4. Determination of pH, Specific gravity, acidity of raw and processed milk
5. Resasuring test for completeness of Pasteurization.
6. Spray drying of milk
7. Manufacture of yogurt
8. Pasteurization of milk
9. Preparation of butter
10. Preparation of cheese
11. Phosphates test
12. Determine total plate count and coli form in milk and milk products.
13. Preparation of flavored milk
14. Adulteration test of raw, milk.
15. Sensory evaluation of raw and processed milk.
16. Determination of cheese faults and grading methods

FPPT 242 OIL AND FAT PROCESSING TECHNOLOGY

Total Contact Hours

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

AIM: At the end of the course the students will be able to understand the technology involved in the processing and preservation of fats and oils.

COURSE CONTENTS

1. INTRODUCTION 4 hours

1.1 History, growth and production
1.2 Lipids, oils and fats, ghee and wax
1.3 Importance
1.4 Sources
1.5 Uses

2. EXTRACTION AND PROCESSING OF OILS AND FATS 12 hours

2.1 Processing of oil seeds
2.2 Rendering
2.3 Expression
2.4 Solvent extraction
2.5 Degumming
2.6 Refining
2.7 Bleaching
2.8 Deodorization
2.9 Fractionation
2.10 Winterization
2.11 Hydrogenation
2.12 Interesterification
2.13 Esterification
2.14 Emulsification
2.15 Packaging

3. CHARACTERISTICS OF OIL, FATS AND FATTY ACIDS 3 hours

3.1 Classification
3.2 Physical and chemical properties

4. SPOILAGE 3 hours

4.1 Oxidative Rancidity
4.2 Hydrolytic Rancidity
4.3 Polymerization

5. MANUFACTURING 10 hours

5.1 Manufacture of vegetable ghee and oil
5.2 Manufacture of margarine
5.3 Manufacture of by-products
5.4 Manufacture of mayonnaise
5.5 Manufacture of frying oils

BOOKS RECOMMENDED:

1- S.A. Termazi, Vegetable Oils and Fats, Ferozesons, Lahore
2- T.J. Weiss, Food Oils and Their Uses, AVI, Westport
3- Y.H. Hui, 1996. Bailey's Industrial Oils and Fat Products, Vol.1-5. John Wiley and Sons Inc., New York
4- R.D. O'Brien, 2000. Fats and Oils Formulating and Processing for Application, 2nd ed., CRC Press, London.
5- AOAC, 2005. Official Methods of Analysis. Association of Official Analytical Chemists, Arlington.

FPPT 242 OIL AND FAT PROCESSING TECHNOLOGY

INSTRUCTIONAL OBJECTIVES

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

1. UNDERSTAND THE BASICS OF OILS AND FATS

1.1 Describe the history, growth and production of oil and fat industry
1.2 Classify and differentiate between Lipids, oil and fats, ghee and wax
1.3 Describe the important sources of oils and fats
1.4 Discuss the important uses of oils and fats
1.5 Explain the differences in chemical nature of oil and fat, ghee and waxes
1.6 Differentiate animal and plant fat

2. UNDERSTAND THE EXTRACTION AND PROCESSING OF OIL AND FATS

2.1 Explain the extraction of oil from oil seeds
2.2 Discuss rendering, expression and solvent extraction of oil
2.3 Enlist various machines used in extraction of oils
2.4 describe various unit operations involved in processing of oil and fat
2.5 Describe refining of vegetable oils
2.6 Explain removable of free fatty acids
2.7 Explain elimination of coloring matter in oil
2.8 Discuss the enrichment of oil and ghee with vitamins
2.9 Explain how unsaturated fatty acids are changed to saturated fatty acids
2.10 Discuss the use of catalyst during hydrogenation
2.11 Explain the change from sis to Trans fatty acids during interesterification
2.12 Discuss anti-nutritive value of trans fatty acids

3. UNDERSTAND THE CHARACTERISTICS OF OILS AND FATS

3.1 Discuss the physical and chemical properties of oils and fats
3.2 Explain saturated and unsaturated fatty acids
3.3 Differentiate between sis and trans fatty acids

4. UNDERSTAND THE SPOILAGE OF OILS AND FATS

4.1 Explain oxidative and hydrolytic rancidity and its control
4.2 Define antioxidants and explain its mechanism
4.3 Explain polymerization
4.4 Explain changes during frying of oils

5. MANUFACTURING OF OIL, FATS AND PRODUCTS

5.1 Describe commercial manufacturing of vegetable ghee and oil
5.2 Differentiate between margarine and butter
5.3 Explain manufacturing of margarine and spreads
5.4 Explain the composition and processing steps of in preparation of mayonnaise and salad oils
5.5 Explain the chemistry of frying
5.6 Identify oil and fat suitable for frying
5.7 Explain the problems of flavor deterioration in storage of oil and fat
5.8 Explain rendering of beef and mutton fat

FPPT 242 OIL AND FAT PROCESSING TECHNOLOGY

LIST OF PRACTICALS **96 hours**

1 Extraction of oils and fats
2 Determination of refractive index
3 Measurement of color
4 Determination of melting point of oil
5 Determination of melting point of butter
6 Determination of specific gravity
7 Determine the peroxide value of oil
8 Determine the saponification value of oil
9 Determine the iodine value of oil
10 Visit to oil and fat industry
11 Preparation of mayonnaise
12 Study role of emulsifying agents
13 Determine the quality of frying oils

FPPT 252 SUGAR AND CONFECTIONERY TECHNOLOGY.

Total Contact Hours

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

AIM: At the end of the course the students will be able to understand the technology involved in the processing of sugar and confectionery.

COURSE CONTENTS

1. GENERAL 2 hour

1.1 History and growth
1.2 Production statistics of sugar cane and sugar beet
1.3 Utilization of sugar
1.4 Composition and nutritional value

2. INDIGENOUS TECHNOLOGY -- SUGAR PROCESSING 2 hours

2.1 Small scale sugar production
2.2 Gur
2.3 Khund
2.4 Shakar

3. SUGAR MANUFACTURING 6 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

4. REFINING 10 hours

4.1 Affination
4.2 Clarification
4.3 Carbonation
4.4 Sulphitation
4.5 Phosphitation
4.6 Crystallization
4.7 Centrifugation
4.8 Drying
4.9 Bagging
4.10 Storage

4.11Factors affecting sugar processing
4.12 Recent advances in sugar technology
4.13 Packaging and storage of sugar
4.14Properties of sugar
4.15 Quality control

5. **CONFECTIONERY** **12 hours**

5.1.Confectionery industry in Pakistan
5.2 Classification, Composition and nutritional value
5.3 Sugar confectionery: formulation and manufacture
5.4 Processing of hard boiled sweets, toffee and fudge
5.6 Formulation and manufacture processes of gums and jellies
5.7.Formulation and manufacture of chocolate confectionery
5.8.Quality control

BOOKS RECOMMENDED:

1 G.R.E. Lionnet, 1999. Sugar Technology for Students. Lang Fred, Durban.
2 E.B. Jacjson, 1995. Sugar Confectionery Manufacture. 2nd ed. Balckie Academic and Professional Wester, Glassgow.
3 C. Chen, 2001. The Sugar Refining – A Manual for the Design and Refining Facilities, John Wiley and Sons, London.
4 W.P. Edwards, 2000. The Science of Sugar Confectionery, Royal Society of Chemistry, Cambridge

FPPT 252 SUGARS AND CONFECTIONERY TECHNOLOGY.

INSTRUCTIONAL OBJECTIVES

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

1. UNDERSTAND THE FUNDAMENTALS OF SUGAR INDUSTRY

1.1 Describe the history and growth of sugar processing industry
1.2 Describe the production statistics of sugar cane and sugar beet in Pakistan
1.3 Enlist major items for utilization of sugar
1.4 Explain the chemical composition and nutritional value of all sugar sources

2 KNOW THE INDEGENOUS TECHNOLOGY

2.2 Discuss the status of small scale sugar production in Pakistan
2.3 Enlist the indigenous products and discuss their processing(gur,khund.shakar)

3. UNDERSTAND MANUFACTURING OF SUGAR

3.1 Discuss all the unit operations involved in sugar manufacturing

4. UNDERSTAND THE REFIINING PROCESS OF SUGAR.

4.1 Define affination and its significance
4.2 Define clarification and its role
4.3 Define carbonation and its significance
4.4 Define sulphitation, phosphitation.
4.5 Explain process of crystallization
4.6 What is the importance of centrifugation
4.7 Explain the role of drying
4.8 Define bagging, storage
4.9 Discuss the factors affecting the processing of sugars
4.10 Discuss the recent advances in sugar technology
4.11 Discuss packaging and storage of sugar
4.12 Describe properties of sugars
4.13 Discuss the role of quality control in sugar industry

5. UNDERSTAND THE PROCESSING OF CONFECTIONS..

5.1 discuss the status of confectionary industry in Pakistan
5.2 describe classification, composition and nutritional value
5.3 discuss the formulation and manufacturing of sugar confectionary

5.4 describe the processing of hard boiled candies, toffee an fudges
5.5 describe the processing of gums and jellies
5.6 describe the processing of chocolate confectionary
5.7 describe the role of quality control in confectionary industry.

FPPT 252 SUGARS AND CONFECTIONERY TECHNOLOGY

LIST OF PRACTICALS **96 hours**

1. Analysis of sugar for TSS
2. Analysis of sugar for pH
3. Analysis of sugar for fiber
4. Analysis of sugar for ash
5. Analysis of sugar for polarization
6. Clarification of raw juice
7. Determine the density of juice by Picnometer
8. Determine the turbidity of juice by Turbidity meter
9. Determine total sugar of juice
10. Visit to sugar industry
11. Visit to confectionery unit
12. Preparation of candy, toffee and other sugar based confectionery
13. Determine inversion of sugar

FPPT 273 GENERAL AND FOOD MICROBIOLOGY

Total Contact Hours

		T	P	C	
Theory	64				
Practical	96		2	3	3

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

COURSE CONTENTS

1 INTRODUCTION TO MICROBIOLOGY 4 hours

- 1.1 Scope of microbiology
- 1.2 Evolution of microbiology
- 1.3 Classification of microorganisms
- 1.4 Microorganisms important in food

2 CHARACTERISTICS OF MICROORGANISMS 6 hours

- 2.1 Bacteria
- 2.2 Moulds
- 2.3 Yeasts
- 2.4 Viruses

3 MICROORGANISMS AND DISEASE 6 hours

- 3.1 Pathogens, virulence and infection
- 3.2 Resistance and immunity
- 3.3 Food and water-borne diseases

4 FOOD AS A SUBSTRATE FOR MICROORGANISMS 8 hours

- 4.1 Nutrients
- 4.2 Moisture
- 4.3 Hydrogen ion concentration (pH)
- 4.4 Oxidation reduction potential
- 4.5 Inhibitory substances and biological structure

5 CONTAMINATION OF FOODS DURING PROCESSING AND PRESERVATION 8 hours

- 5.1 From green plants and fruits
- 5.2 From animals
- 5.3 From sewage
- 5.4 From soil

5.5 From water
5.6 From air
5.7 During handling and processing
5.8 During preservation
5.9 Harmful effects of microbes
5.10 Beneficial effects of microbes

6 GENERAL PRINCIPLES OF MICROBIAL SPOILAGE 8 hours

6.1 Microbial food spoilage
6.2 Characteristics of some spoilage organisms
6.3 Factors affecting kind and number of microorganisms in food
6.4 Factors affecting the growth of microorganisms in food
6.5 Chemical changes caused by microorganisms

7 CONTROL OF MICROORGANISMS 8 hours

7.1 Fundamentals of microbial control
7.2 Control by physical means
7.3 Control by chemical agents
7.4 Antibiotics and other chemotherapeutic agents

8 PRODUCTION OF CULTURES FOR FOOD FERMENTATIONS 8 hours

8.1 General principles of culture preparation and maintenance
8.2 Bacterial cultures
8.3 Yeast cultures
8.4 Mould cultures

9 FOOD BORNE DISEASES 8 hours

9.1 Food borne infections
9.2 Food borne intoxications
9.3 Non bacterial food poisoning

RECOMMENDED BOOKS

1. M. I. Pelezar, Jr. and R.D. Ried, Microbiology, McGraw Hill Book. Co., New York
2. W.C. Frazier and D.C. Westhoff, 1988. Food Microbiology, McGraw Hill Book Co, New York.
3. J. M. Jay, Modern Food Microbiology, 1996. 5th ed. Food and Nutrition Press ISB#0-412-076-918.

4. J. A. Awan and S. U. Rehman, Microbiology Manual, 2005. Unitech Communications Faisalabad.

FPPT 273 GENERAL AND FOOD MICROBIOLOGY

INSTRUCTIONAL OBJECTIVES

On the completion of this course, the student will be able to:

1. UNDERSTAND THE HISTORICAL DEVELOPMENT OF MICROBIOLOGY

1.1 Enlist earliest scientists who discovered Microbiology
1.2 Describe the role of Leuwenhoek, Koch, Smith, Pasteur, Fleming and Lister
1.3 Define cell
1.4 Explain the difference between plant and animal cells with the help of diagrams
1.5 Differentiate between procaryotes and eucaryotes
1.6 Define species, genus, tribe, family, order, class, phylum and kingdom
1.7 Explain classification of microorganisms

2 UNDERSTAND THE CHARACTERISTICS OF MICROORGANISMS

2.1 Define and identify different types of bacteria
2.2 Describe the general characteristics of bacteria
2.3 Enlist important genera of bacteria useful in food microbiology
2.4 Explain the general characteristics of yeasts
2.5 Discuss the yeasts of industrial importance
2.6 Explain the general characteristics of moulds
2.7 Differentiate between bacteria, yeast and mould
2.8 State general characteristics of virus

3 UNDERSTAND THE RELATIONSHIP OF MICROORGANISMS AND DISEASE

3.1 Define pathogens, virulence, infection, resistance and immunity
3.2 Enlist types of immunity
3.3 Explain beneficial role of immunity in nature
3.4 Enlist different infectious diseases common in man

4 UNDERSTAND ROLE OF FOOD AS A SUBSTRATE FOR MICROORGANISMS

4.1 Define pH
4.2 Explain the importance of pH for the growth of microorganisms
4.3 Describe the concept of water activity

4.4 Explain the mechanism of oxidation-reduction potential
4.5 Discuss different inhibitory substances present in food
4.6 Describe the importance of biological structure of food

5 UNDERSTAND THE MECHANISM OF FOOD CONTAMINATION DURING FOOD PROCESSING AND PRESERVATION

5.1 Identify species of microorganisms contaminating fruits and vegetables
5.2 Enlist sources of contaminating microorganisms from animals
5.3 Explain the mechanism of foods getting contaminated by sewage
5.4 Describe contamination of foods from soil
5.5 Discuss water as a source of contamination
5.6 Explain how microorganism in air cause contamination of foods
5.7 Discuss how contamination takes place during handling, processing and preservation of different food commodities and its control
5.8 Explain the mechanisms, reactions and control of contamination.
5.9 Explain major chemical changes during contamination.

6 UNDERSTAND PRINCIPES OF MICROBIAL SPOILAGE

6.1 Define microbial spoilage
6.2 List of types of microbial spoilage
6.3 Classify foods on the basis of ease of spoilage
6.4 List main groups of micro- organisms
6.5 Explain the factors affecting the growth of microorganisms in food
6.6 Describe the chemical changes caused by microorganisms in food

7 UNDERSTAND CONTROL OF MICROORGANISMS

7.1 State three principal reasons for practicing methods of microbial control
7.2 State the physical methods applied to control microorganisms
7.3 Enlist major groups of chemical antimicrobial agents
7.4 Define antibiotics and chemotherapeutic agents
7.5 Explain the function of antibiotics

8 UNDERSTAND THE PRODUCTION OF CULTURES FOR FOOD FERMENTATIONS

8.1 State general principles of culture maintenance and preparation
8.2 Explain pure and mixed cultures
8.3 Explain the use of bacterial cultures in food industry
8.4 Explain the use of yeast for bread and malt beverages
8.5 Explain the use of mould cultures for cheese production

9 UNDERSTAND FOODS IN RELATION TO DISEASE

9.1 Classify food borne diseases
9.2 Define food poisoning and infection

9.3 Give examples of bacteria for food borne itoxications and infections
9.4 Explain Butulism and Salmonellosis
9.5 Describe non bacterial food borne diseases
9.6 Explain the significance of Aflatoxin

FPPT 273 GENERAL AND FOOD MICROBIOLOGY

LIST OF PRACTICALS 96 hours

1 Safety precautions in microbiology lab
2 Introduction to equipment in the microbiological lab
3 Demonstrate the use of microscope
4 Examination of plant and animal cells
5 Examination of yeasts, moulds and bacteria
6 Demonstrate the use of autoclave and hot air oven for sterilization
7 Preparation of culture media
8 Cultivation and isolation of bacteria
9 Examination of bacterial colonies
10 Determination of bacterial numbers
11 Staining reagents and procedures
12 Microbiological examination of important food microbes
13 Examination of spoiled canned foods for possible microorganisms
14 Find optimum growth temperature for an organism
15 Determination of microbial load in different food samples
16 Perform swab and dilution tests for assessing cleaning efficiency.
17 Visit to microbiology laboratory of a university / research institute
18 Visit to a food industry to observe role of microbiology

FPPT-283 FOOD CHEMISTRY AND INSTRUMENTATION

Total Control Hours

		T	P	C
Theory	64			
Practical	96	2	3	3

AIM: The student will be able to understand the food components in relation to food processing and preservation, and will be able to use the principles and procedures of analytical and instrumental techniques employed in food analysis.

COURSE CONTENTS

1. WATER 4 hours

1.1 Nature in foods
1.2 Water activity and food spoilage
1.3 Physical and chemical properties
1.4 Hard and soft waters

1.5 Water treatment process
1.6 Effect of water quality on processed foods

2. CARBOHYDRATES **8 hours**

2.1 Classification
2.2 Chemical structure
2.3 Physical and chemical properties
2.4 Effect of processing
2.5 Qualitative tests for carbohydrates
2.6 Quantitative tests for sugars
2.7 Estimation of starch

3. LIPIDS **8 hours**

3.1 Classification
3.2 Fatty acids
3.3 Physical properties
3.4 Chemical properties
3.5 Autooxidation and rancidity
3.6 Functional properties in foods
3.7 Effect of processing
3.8 Physical constants of fat
3.9 Chemical constants of fat

4. PROTEINS **8 hours**

4.1 Classification
4.2 Amino acids
4.3 Physical and chemical properties
4.4 Functional properties in foods
4.5 Effect of processing
4.6 Quantitative determination of protein

5. VITAMINS **4 hours**

5.1 Classification
5.2 Functional properties in foods
5.3 Effect of processing
5.4 Determination of Vitamin-C

6. OTHER CONSTITUENTS **8 hours**

6.1 Mineral elements
6.2 Pigments
6.3 Aromatic compound
6.4 Antinutritional compounds
6.5 Organic acids
6.6 Enzymes

7. SAMPLING TECHNIQUES **4 hours**

7.1 Perfect and composite sample
7.2 Sampling procedure
7.3 Sampling instruments
7.4 Sample grinding
7.5 Sample storage

8. PROXIMATE ANALYSIS 12 hours

8.1 Introduction
8.2 Determination of moisture
8.3 Determination of ash
8.4 Determination of crude protein
8.5 Determination of crude fat
8.6 Determination of crude fiber
8.7 Determination of nitrogen

9. PRINCIPLES OF INSTRUMENTATION 4 hours

Introduction to
Electromagnetic spectrum, Radiant energy, Light transmission
Principles of emission and absorption of light, Absorption spectrum

10. INTRODUCTION TO INSTRUMENTAL TECHNIQUE

4 hours

10.1 Introduction
10.2 Principles and types of chromatography
10.3 pH
10.4 Polarimetry
10.5 Refraction of light
10.6 Flame-photometry

RECOMMENDED BOOKS

1. J.A. Awan, 2005. Food and Nutrition, Unitech Communications, Faisalabad.
2. I.H. Meyer, 1976. Food Chemistry, Reinhold Publisher Corporation, New York.
3. F.A. Lec, 1982. Basic Food Chemistry, AVI Publishers, Westport.
4. O.R. Fennema, 1992. Food Chemistry, Marcel Dekker, Inc., New York.
5. T.P. Coultate, 1999. Food; The Chemistry of its Components. The Royal Society of Chemistry, Cambridge.
6. H.D. Belitz and W. Grosch, 1999. Food Chemistry. 2nd Ed. Springer- Verlag Heidelberg.
7. A.O.A.C. 2005. Official Methods of Analysis. 18th Ed. Association of Official Analytical Chemists, Arlington.
8. R.S. Kirk and R. Sawyer, 1991. Pearson's Composition and Analysis of Foods, 9th Ed. Longman, London.
9. Y. Pomeranz and C.E. Meloan, 1996. Food Analysis: Theory and Practice. 3rd Ed. CBS Publishers, New Delhi.
10. S.S. Nielson, 2003. Food Analysis Laboratory Manual. Chips Limited, USA.

11. J.A. Awan and S. U. Rehman, 2005. Food Analysis Manual, Unitech Communications, Faisalabad.
12. G.T. Bender, 1987. Principles of Chemical Instrumentation. W.B. Saunders, London.
13. Iqtadar Ahmad Khalil and Fazil Manan, Chemistry I- Bio-analytical Chemistry.
14. H.H. Baner et al., Instrumental Analysis.

FPPT-123 FOOD CHEMISTRY AND INSTRUMENTATION

INSTRUCTIONAL OBJECTIVES

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

1. UNDERSTAND THE NATURE AND PROPERTIES OF WATER

1.1 Explain the nature of water as it exists in foods
1.2 Explain the relationship between water activity and food spoilage
1.3 State the physical properties
1.4 State the chemical properties
1.5 Explain the nature of hard and soft waters
1.6 Explain the role of hard and soft waters
1.7 Describe the methods of water treatment
1.8 Explain the role of water on the quality and shelf life of foods.

2 UNDERSTAND THE NATURE AND PROPERTIES OF CARBOHYDRATES

2.1 Distinguish between various classes of carbohydrates
2.2 Explain various physical properties of each
2.3 Discuss the chemical structure of each
2.4 Explain various chemical properties of each
2.5 Discuss the role of physical and chemical properties in food processing
2.6 Discuss the effect of processing on carbohydrates

3. UNDERSTAND THE NATURE AND PROPERTIES OF LIPIDS

3.1 Describe the structure of fatty acids
3.2 Explain the classifications
3.3 Describe the physical properties
3.4 Describe chemical properties
3.5 Explain the functional properties
3.6 Explain the effect of processing
3.7 Explain deteriorative changes.

4. UNDERSTAND THE NATURE AND PROPERTIES OF PROTEINS

4.1 Describe the structure of amino acids
4.2 Explain classification
4.3 Discuss physical properties
4.4 Discuss chemical properties
4.5 Explain Millard reaction
4.6 Discuss functional properties of various proteins especially gluten, casein and albumin
4.7 Discuss effect of processing.

5. UNDERSTAND THE NATURE AND PROPERTIES OF VITAMINS

5.1 Explain classification
5.2 Discuss functions of fat-soluble vitamins in food processing
5.3 Discuss functions of water-soluble vitamins in food processing
5.4 Discuss effect of processing on their nature and properties

6. UNDERSTAND THE NATURE AND PROPERTIES OF OTHER CONSTITUTENTS

6.1 Describe effect of mineral elements on food
6.2 Differentiate between types of pigments
6.3 Differentiate between various aromatic compounds
6.4 Describe anti-nutritional compounds in selected foods
6.5 Describe the nature of organic acids in foods
6.6 Describe the classification and properties of enzymes.

7. UNDERSTAND SAMPLING TECHNIQUES

7.1 Illustrate the significance of food analysis in food industry
7.2 Define quantitative and qualitative analysis
7.3 Define perfect and composite sample
7.4 Explain sampling procedure and enlist sampling instruments
7.5 Explain procedure for sample grinding
7.6 Describe procedure for sample storage

8. KNOW THE PROXIMATE ANALYSIS

8.1 Define proximate analysis
8.2 State methods of analysis for moisture
8.3 State methods of analysis for crude fat
8.4 State methods of analysis for ash
8.5 State methods of analysis for crude fiber
8.6 State methods of analysis for nitrogen free extract

9. UNDERSTAND INSTRUMENTATION PRINCIPLES

9.1 Describe the importance, need and scope of instrumentation
9.2 Define electromagnetic spectrum
9.3 Define the nature of radiant energy
9.4 Define transmission of light through solutions and solids
9.5 Define transmission of white light
9.6 State the principle of emission and absorption of light
9.7 Describe the process of absorption by molecules
9.8 Define absorption spectrum
9.9 Define principles of spectrophotometry.

10. UNDERSTAND INSTRUMENTAL TECHNIQUES

10.1 Illustrate the importance of instrumental techniques

10.2 State the principles of chromatography
10.3 Enlist types of chromatography
10.4 Describe HPLC, gas chromatography, TLC and paper chromatography
10.5 State principles and application of pH meter
10.6 Define polarized light
10.7 Discuss principles and application of polarimeter
10.8 Define refractive index
10.9 Explain the working of refractometer
10.10 Explain principles of flame photometry
10.11 Describe instrumental methods for texture measurement
10.12 Define viscosity
10.13 Discuss measurement of viscosity

FPPT-123 FOOD CHEMISTRY AND INSTRUMENTATION

LIST OF PRACTICALS 96 hours

1 Study water activity in foods
2 Visit to water treatment plant
3 Study the effect of reducing sugars on color of potato chips
4 Study the effect of reducing sugars and amino acid content on browning in potato chips
5 Preparation of invert sugar by acid hydrolysis
6 Acid hydrolysis of starch
7 Maillard reaction
8 Demonstration of heat denaturation of various proteins
9 Physical and chemical properties of lipids
10 Demonstration of effect of baking on browning and flavor
14. Determination of moisture by different methods
15. Determination of ash and mineral matter
16. Determination of insoluble solids (fiber)
17. Determination of reducing sugars
18. Determination of total sugars
19. Determination of acidity
20. Determination of benzoic acid
21. Determination of nitrite and nitrate
22. Determination of sodium, potassium and calcium by flame .
23. Physical and chemical analysis of fats and oils
24. Determination of vitamin C.
25. Visit to a research laboratory.

اسلامیات / مطالعہ پاکستان

نصاب (سال سوئم)	GEN 312	ت ع ک
حصہ اول اسلامیات		1 0 1
حصہ دوم مطالعہ پاکستان		کل وقت: 30 گھنٹے

موضوعات:

-1 قرآن مجید

سورۃ الفاتحہ۔ آیۃ الکرسی۔ سورۃ البقرۃ کی آخری آیات امن الرسول سے آخر تک اور سورۃ اخلاص مع ترجمہ و تشریح

-2 دس منتخب احادیث مع ترجمہ و تشریح

☆ بنی الاسلام علی خمس شہادۃ ان لا الہ الا اللہ و اقام الصلوۃ و ایتاء الزکوۃ و حج البیت و صوم رمضان

☆ الدین النصیحۃ

☆ المستشار مؤتمن

☆ للمومن علی المومن ست خصال یعودہ اذا مرض و تشہدہ اذا مات و یجیبہ اذا دعا

☆ لیسلم علیہ اذا لقیہ و یشمتہ اذا عطس و ینصح لہ اذا غاب او شہد

☆ لا تخن من خانک

☆ لا یدخل الجنۃ قاطع

☆ ان اللہ حرم علیکم عقوق الامہات و اضاعۃ المال

☆ یسروا ولا تعسروا ولا تنفروا

☆ ذاق طعم الایمان من رضی باللہ ربا و بالاسلام دینا و بمحمد نبیا

☆ افضل الذکر لا الہ الا اللہ

-3 حقوق و فرائض

حصول تعلیم بطور فرض۔ والدین اور اولاد کے حقوق و فرائض۔ ہمسایہ کے حقوق

-4 اسلام کی اخلاقی اقدار

صبر و استقلال۔ عفو و درگذر۔ ایفائے عہد۔ اخوت۔ ایثار و قربانی

سال سوئم
حصہ اول اسلامیات

تدریس مقاصد

قرآن حکیم
عمومی مقصد: 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: آیۃ الکرسی۔ سورۃ بقرۃ کی آخری آیات از امن الرسول سے اور سورۃ اخلاق کا ترجمہ و تشریح 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 ہو گی
☆ عبادت 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
☆ تعلیم 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 انسانی بسلط میں ہے
☆ کفر کو اللہ کی مدد کے بغیر شکست نہیں دی جا سکتی
☆ اللہ ایک ہے
☆ اللہ کسی کا محتاج نہیں نہ اس کا کوئی شریک ہے

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

☆ احادیث کا ترجمہ بیان کر سکے

☆ احادیث کی تشریح کر سکے

☆ معاشرتی اور انفرادی زندگی میں احادیث سے راہنمائی حاصل کر سکے

حقوق و فرائض

عمومی مقصد: اسلامی معاشرے کا ایک اچھا فرد بن سکے

خصوصی مقاصد:

☆ والدین کے حقوق و فرائض بیان کر سکے

☆ ہمسایوں کے حقوق بیان کر سکے

☆ اسلام میں حقوق و فرائض کی صورت میں اپنے اندر خدمت خلق کا جذبہ پیدا کر سکے

اسلامی اقدار

عمومی مقصد: طالب علم جان سکے گا کہ تعلیم کا مقصد حسن اخلاق سے متصف ہونا ہے

خصوصی مقاصد

☆ اخلاق کے معنی و مفہوم کو بیان کر سکے

☆ اسلام میں حسن اخلاق کی اہمیت بیان کر سکے

☆ قرآن و سنت کی روشنی میں صبر و استقلال کی اہمیت بیان کر سکے

☆ اسلام میں عفو و درگزر کی اہمیت بیان کر سکے

☆ ایفائے عہد کی اہمیت بیان کر سکے

☆ اخوت کے معنی و مفہوم کو بیان کر سکے

☆ اخوت اسلامی کی اہمیت بیان کر سکے

☆ اسلام کی اعلیٰ اقدار کو اپنا کر مثالی معاشرہ پیدا کر سکے

مطالعہ پاکستان (حصہ دوئم)

قیام پاکستان

تدریس مقاصد

عمومی مقاصد: قیام پاکستان کے بعد درپیش مسائل سے آگاہی حاصل کرے اور بیان کرے

☆ خصوصی مقصد:

☆ باؤنڈری کمیشن تشکیل اور اس کے فرائض بیان کر سکے

☆ ریڈ کلف اور اس کے ایوارڈ کے بارے میں 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 بارہ میں تفصیل بیان کر سکے

☆ ریاست جموں کشمیر کے بارے میں بیان کر سکے

☆ نہری پانی کے تنازعہ کو بیان کر سکے

☆ قرار داد مقاصد کی تفصیلات بیان کر سکے

☆ 22 علماء کے متفقہ اسلامی نکات بیان کر 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

☆ پاکستان میں قدرتی وسائل (تیل۔ گیس۔ کوئلہ) کے بارہ میں بیان کر سکے

(غیر مسلم طلباء کے لئے)

نصاب اخلاقیات		ٹی	پی	سی
سال سوئم	Gen 3:11	1	0	1
موضوعات		کل وقت: 20		

- ☆ احساس ذمہ داری
- ☆ مثبت ذہن
- ☆ عدل و انصاف
- ☆ قومی خدمت کا جذبہ
- ☆ ذکر و نظر کی پاکیزگی
- ☆ احترام آدمیت
- ☆ شائستگی
- ☆ عفو و درگزر
- ☆ بردباری
- ☆ خود انحصاری
- ☆ اثر و نفوذ
- ☆ جامعیت
- ☆ اپنی ذات کی معرفت (بذریعہ ہم عمر طلباء۔ اساتذہ۔ اہم شخصیات ادارہ)

(غیر مسلم طلباء کے لئے)

نصاب اخلاقیات

سال سوئم

تدریس مقاصد

عمومی مقصد: ملکی ترقی کے لیئے اعلیٰ اوصاف کے ساتھ بہتر طور پر ملک و ملت کی خدمت کر سکے

خصوصی مقاصد: طالب علم اس قابل ہو گا 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 و انصاف 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

MGM-321 **BUSINESS COMMUNICATION**

T	P	C
1	0	1

Total contact hours

Theory **32 Hrs**.

Pre-requisites: The students shall already be familiar with the language concerned.

AIMS The course has been designed to enable the students to.

1. Develop communication skills.
2. Understand basic principles of good and effective business 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 f 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 & TECHNICAL REPORT WRITING

INSTRUCTIONAL OBJECTIVES

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

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.

MGM-311 INDUSTRIAL MANAGEMENT AND HUMAN RELATIONS.

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

AIMS The study of this subject will enable the student to develop the management skill, acquaint him with the principles of management and human relations and develop psychological approach to solve the labour problems.

COURSE CONTENTS

1. INDUSTRIAL PSYCHOLOGY. 2 Hours
- 1.1 History and definition.
- 1.2 Nature and scope.

2. LEADERSHIP 1 Hour
- 2.1 Definition and types.
- 2.3 Qualities of a good leader.

3. MOTIVATION 2 Hours
- 3.1 Definition.
- 3.2 Types (Financial and non financial motives).
- 3.3 Conflict of motives.

4. MORALE 1 Hour
- 4.1 Importance.
- 4.2 Development.
- 4.3 Measurement.

5. HUMAN ENGINEERING. 1 Hour
- 5.1 Importance of human factor in industry.
- 5.2 Man-machine system.
- 5.3 Strategy for making allocation decisions.

6. INDUSTRIAL FATIGUE AND BOREDOM. 2 Hours
- 6.1 Definition and distinction.
- 6.2 Psychological causes.
- 6.3 Objective causes.
- 6.4 Prevention

7. INDUSTRIAL ACCIDENTS 2 Hours
- 7.1 Psychological causes.
- 7.2 Objective causes.
- 7.3 Prevention

8. INDUSTRIAL PREJUDICE **2 Hours**

8.1 Causes
8.2 Remedies

9. PUBLIC RELATIONS. **2 Hours**

9.1 Importance
9.2 Functions

10. GUIDANCE AND COUNSELLING **2 Hours**

10.1 Importance
10.2 Choice of job.
10.3 During service.

11. JOB EVALUATION **2 Hours**

11.1 Importance
11.2 Methods
11.3 Job satisfaction
11.4 Work simplification.

12. INDUSTRIAL MANAGEMENT **2 Hours**

12.1 Introduction
12.2 Functions of management.
12.3 Subdivisions of management
12.4 Objectives of industrial management.

13. PERSONNEL SELECTION. **2 Hours**

13.1 Recruitment of employees.
13.2 Training.
13.3 Effects of training on production and product cost.

14. WORKING CONDITIONS. **2 Hours**

14.1 Importance and consideration.
14.2 Effects on efficiency and per unit cost.

15. TIME AND MOTION STUDY. **3 Hours**

15.1 Concept and importance.
15.2 Sequence of motion study.
15.3 Principles of motion study.
15.4 Steps to time study.
15.5 Determination of operations time.

16. QUALITY CONTROL. **2 Hours**

16.1 Concept and advantages
16.2 Methods.

17. ROLE OF FOREMAN IN MANAGEMENT. 2 Hours

17.1 Foreman's abilities.

17.2 Duties and functions.

BOOKS RECOMMENDED:

1 C.S. Meyers, Industrial Psychology, Oxford University Press, London.

2. Smith Wakley, Psychology of Industrial Behaviors, Mc-Graw Hill, New York.

3. Ghulam Hussain, Nizamat-e-Sanaat Aur Insani Rawabat, Ilmi Kitab Khana, Urdu Bazar, Lahore.

4. Andrew R. Megill, The Process of Management William M New Man.

5. Richard N Omen, Management of Industrial Enterprises.

MGM-311 INDUSTRIAL MANAGEMENT AND HUMAN RELATIONS.

INSTRUCTIONAL OBJECTIVES

At the completion of this course, the students will be able to:

1. KNOW INDUSTRIAL PSYCHOLOGY.
- 1.1 Describe brief history if industrial psychology.
- 1.2 Describe in detail definition of industrial psychology.
- 1.3 State nature and scope of industrial psychology.

2. KNOW LEADERSHIP.
- 2.1 Define leadership.
- 2.2 Describe types of leadership.
- 2.3 State qualities of a good leader.

3. UNDERSTAND MOTIVATION.
- 3.1 Define motivation.
- 3.2 Describe financial and non financial motives.
- 3.3 Explain conflict of motives.

4. KNOW MORALE.
- 4.1 State importance of morale.
- 4.2 Describe development of morale.
- 4.3 State the method of measurement of morale.

5. UNDERSTAND HUMAN ENGINEERING.
- 5.1 Explain importance of human engineering in the industry.
- 5.2 Explain man-machine system.
- 5.3 Explain strategy for making allocation decisions.

6. UNDERSTAND INDUSTRIAL FATIGUE AND BOREDOM.
- 6.1 Define fatigue and boredom.
- 6.2 Describe psychological causes of fatigue and boredom.
- 6.3 Describe objective causes of fatigue and boredom.
- 6.4 Explain measures to prevent fatigue and boredom.

7. UNDERSTAND INDUSTRIAL ACCIDENTS.
- 7.1 Explain psychological causes of industrial accidents.
- 7.2 Explain objective causes of industrial accidents.
- 7.3 Explain measures to prevent industrial accidents.

8. UNDERSTAND INDUSTRIAL PREJUDICE.
- 8.1 Define prejudice
- 8.2 Explain causes of industrial prejudice.
- 8.3 Explain remedies of industrial prejudice.

9. UNDERSTAND THE SIGNIFICANCE OF PUBLIC RELATIONS.

9.1 Explain importance of public relations.
9.2 Explain functions of public relations.

10. UNDERSTAND THE NEED FOR GUIDANCE AND COUNSELING.

10.1 State importance of guidance and counselling.
10.2 Explain the role of guidance and counselling in choosing the job.
10.3 Describe help of guidance and counselling during service.

11. UNDERSTAND JOB EVALUATION.

11.1 Explain importance of job evaluation.
11.2 Explain methods of job evaluation.
11.3 Explain job satisfaction.
11.4 Explain work simplification.

12. UNDERSTAND INDUSTRIAL MANAGEMENT.

12.1 Define management.
12.2 State functions of management.
12.3 Enlist subdivision of management.
12.4 Explain objectives of industrial management.

13. UNDERSTAND TRAINING AND ITS EFFECTS.

13.1 Describe the recruitment procedure of employees in an industrial concern.
13.2 Explain training.
13.3 Identify the kinds of training.
13.4 Explain the effects of training on production and product cost.

14. UNDERSTAND THE EFFECT OF WORKING CONDITION ON EFFICIENCY.

15.1 Explain importance of working condition.
15.2 Describe air-conditioning, ventilation, lighting and noise.
15.3 State the effects of good working conditions on efficiency and per unit cost.

15. UNDERSTAND TIME AND MOTION STUDY.

15.1 Explain the concept.
15.2 Describe the importance of work study.
15.3 Explain the sequence of motion study.
15.4 State the principles of motion study.
15.5 Describe the steps for carrying out time study.
15.6 Explain the method of determination of operations time.

16. UNDERSTAND THE METHODS OF QUALITY CONTROL.

16.1 Define quality control

16.2 State the advantages of quality control.
16.2 Explain methods of quality control.

17. UNDERSTAND THE ROLE OF FOREMAN IN AN INDUSTRIAL UNDERTAKING.

17.1 Explain ability of the foreman.
17.2 Enlist duties of foreman.
17.3 Describe functions of foreman as middle management.

FPPT 314 MEAT POULTRY AND FISH TECHNOLOGY

Total Contact Hours

		T	P	C
Theory	**96**			
Practical	**96**	**3**	**3**	**4**

AIM: The student will be able to understand the general principles of meat, poultry and fish processing technology.

COURSE CONTENTS

1. MEAT AND MEAT PRODUCTS PROCESSING 40 hours

1.1 Types, composition
1.2 Slaughtering, cutting and dressing of animals
1.3 Postmortem changes
1.4 Composition and grading of meat
1.5 Processing and preservation
1.6 Canning
1.7 Freezing
1.8 Salting
1.9 Smoking
1.10 Dehydration
1.11 Spoilage and its control
1.12 Cooked meat products
1.13 Sausages
1.14 Cured and smoked meats
1.15 Reduced and low fat meat products
1.16 Canned meat formulations
1.17 Restructured meat products

2. POULTRY PROCESSING 30 hours

2.1 Classes of poultry meat
2.2 Nutritive value of poultry meat
2.3 Commercial methods of slaughtering and dressing
2.4 Post slaughter handling
2.5 Storage and preservation of poultry meat
2.6 Freezing of poultry meat
2.7 Spoilage and its control

3. EGGS 10 hours

3.1 Composition
3.2 Handling
3.3 Candling and washing
3.4 Coating

3.5 Packaging and storage
3.6 Egg processing
3.7 Spoilage and its control

4. FISH **16 hours**

4.1 Fish industry in Pakistan
4.2 Fresh water and marine fish
4.3 Classification of fish meat
4.4 Quality characteristics
4.5 Commercial handling
4.6 Criteria for freshness
4.7 Fish processing
4.8 Canning
4.9 Freezing
4.10 Drying
4.11 Spoilage and its control

RECOMMENDED BOOKS

1. T.K. Govindon, 1985. Fish Processing Technology. Oxford and IBH Publishing Co. Pvt. Ltd Culcatta.
2. G.J Mountney, 1985. Poultry Product Technology. AVI Publishing Company Inc. Westport Connecticut.
3. A.M. Pearson T.A.Gillet, 1996. Processed Meat. Chapman and Hall Washington.

FPPT 314 MEAT POULTRY AND FISH TECHNOLOGY

INSTRUCTIONAL OBJECTIVES

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

1. UNDERSTAND MEAT AND MEAT PRODUCTS PROCESSING

1.1 Give the composition of beef and mutton
1.2 Explain factors affecting the composition of muscle
1.3 Explain slaughtering, cutting and dressing of animals
1.4 Explain the composition and grading of meat in general
1.5 Discuss processing and preservation of meat
1.6 Explain the processes canning and freezing
1.7 Describe special processing techniques for chilling, salting, braining, smoking, curing, drying, freezing and canning of meat
Explain the spoilage of meat and its control
1.8 Discuss how sausages are prepared
1.9 Explain how low fat meat products are produced
1.10 Explain the some formulation of canned meat products
1.11 Discuss the processing of restructured meat products
1.12 Enlist meat by-products
1.13 Describe preparation and utilization of meat by-products

2. UNDERSTAND POULTRY PROCESSING

2.1 Describe commercial methods of dressing
2.2 Explain post slaughter handling and storage of poultry meat
2.3 Give the composition and classification of poultry.
2.4 Describe processing techniques for freezing and canning of poultry meat
2.5 Discuss how to control spoilage
2.6 Enlist poultry by-products
2.7 Describe preparation and utilization of poultry by-products

3. UNDERSTAND EGG PROCESSING

3.1 Explain nutritive value of eggs
3.2 State methods of egg handling
3.3 Explain grading of eggs
3.4 Describe suitable storage techniques of egg
3.5 Explain quality control in egg and egg products.

4. UNDERSTAND FISH PROCESSING

4.1Describe commercial catching methods, handling and processing of fish
4.2Discuss the criteria for freshness
4.3Give the composition and classification of fish meat
4.4Explain the processing of fish meat
4.5Discuss how spoilage is controlled
4.6Enlist fish by-products
4.7Describe preparation and utilization of fish by-products

FPPT 314 MEAT POULTRY AND FISH TECHNOLOGY

LIST OF PRACTICALS

1 Visit to a slaughter house
2 Visit to a poultry farm
3 Visit to fish harbor site
4 Identification of freshness of meat
5 Identification of freshness of poultry
6 Identification of freshness of fish
7 Identification of freshness of eggs
8 Preparation of sausages
9 Salting and freezing of fish
10 Preservation of poultry meat
11 Preservation of fish meat
12 Preservation of eggs
13 Preservation of meat by smoking and curing
14 Determination of chemical composition of meat
15 Meat preservation by canning
16 Meat preservation by freezing
17 Meat product preparation

FPPT 323 BEVERAGES PROCESSING TECHNOLOGY.

Total Contact Hours

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

AIM: At the end of the course the students will be able to understand the processing and preservation technologies involved in the beverage industry

COURSE CONTENTS

1. GENERAL **6 hour**

1.1 Introduction
1.2 History
1.3 Classification
1.4 Beverage industry in Pakistan
1.5 Nutritional status

2. INGREDIENTS FOR BEVERAGES PRODUCTION **16 hours**

2.1 Water, sources and purification
2.2 Types of water purification systems
2.3 Fruit pulps
2.4 Juices
2.5 Concentrates and other additives
2.6 Sweeteners
2.7 Sugar and artificial sweeteners
2.8 Colors
2.9 Flavors
2.10 Preservatives

3. **BEVERAGES PROCESSING** **30 hours**

3.1. Unit operations in production
3.2. Raw material handling and storage
3.3. Fruit based beverages
3.4. Types, composition and nutritional value
3.5. Nectar
3.6. Cordial
3.7. Squash
3.8. Syrup
3.9. Juice concentrates
3.10. Fruit flavored powders
3.11. Barley water
3.12. Carbonated beverages
3.13. Synthetic beverages

3.14. Low calorie beverages
3.15. Dry mix beverages
3.16. Formulations
3.17. Tea processing
3.18. Bottled water manufacturing
3.19. Traditional beverages production
3.20. Vegetable juice
3.21. Trouble shooting in beverage industry
3.22. Quality control in beverage industry
3.23. Plant sanitation
3.24. Fermented beverages

4. **RECENT ADVANCES IN BEVERAGE TECHNOLOGY 12 hours**

4.1 Recent developments in beverage technology
4.2 Role of bio technology in beverage technology.
4.3 Dietetic drinks
4.4 Energy drinks

BOOKS RECOMMENDED:

1- A.J. Mitchell, 1990. Formulation and Production of Carbonated Soft Drinks. AVI Publishing Co Inc West Port, Connecticut.

2- A. G. H. Lee and J.R. Piggott, 1995. Fermented Beverage Production, Blackie Academic and Professional, London.

FPPT 323 BEVERAGES PROCESSING TECHNOLOGY.

INSTRUCTIONAL OBJECTIVES

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

1. UNDERSTAND BEVERAGE INDUSTRY

1.1 Describe the history and growth of beverage industry
1.2 Give a brief introduction to beverage industry in Pakistan
Explain the classification of beverage industry as hot or cold, carbonated or non carbonated, alcoholic and non alcoholic
1.3 Explain the importance of beverages in various climatic conditions
1.4 Explain the nutritional status of beverages

2. UNDERSTAND THE INGREDIENTS USED IN BEVERAGES PRODUCTION

2.1 Explain the importance of water in beverage industry
2.2 Discuss the different sources
2.3 E explain Purification systems
2.4 Discuss nutritional status of mineral water
2.5 Explain each step of processing of mineral water and its standards
2.6 Give brief introduction to fruit drinks as juices, sherbats, etc.
2.7 Explain the composition of some common fruit juices
2.8 Explain the processing of fruit juice
2.9 Discuss the various steps in processing and the machinery involved in fruit drink preparation
2.10 Explain the composition of some common vegetables(tomatoes,carrots,cucumber) suitable for juice making
2.11 Explain the common steps used in processing of vegetable juice
2.12 Describe how the enzymes are inactivated
2.13 Discuss use of sugar and artificial sweetners
2.14 Explain the use of different flavours and colors and their chemical nature and function
2.15 Explain the use of preservatives in increasing shelf life of beverages and juices
2.16 Explain the harmful effects of beverages.

3. UNDERSTAND THE TECHNOLOGY INVOLVED IN PROCESSING OF BEVERAGES

3.1 Explain each unit operation involved in production of beverages

3.2 Give details of the technology involved in processing and the various machines used in beverage processing
3.3 Give a brief introduction and history of soft drink industry
3.4 Explain the variety of soft drink as squashes, citrus drinks, lemonade and cordials
3.5 Explain the formulation and functions of ingredients used in common soft drinks.
3.6 Explain the role of the components of the soft drinks
3.7 Describe the kinds of additives used in beverages
3.8 Explain the enrichment of drinks
3.9 Describe the neutraceuticals
3.10 Explain history and production of tea and coffee.
3.11 Describe the varieties of tea and give differences in black, green, fruit , chinese tea and herbal tea.
3.12 Describe the composition of various teas and also explain which component of the tea is useful
3.13 Explain the fermentation process in tea industry
3.14 Explain the chemical changes brought in and their effect on flavor and color of tea and coffee during processing
3.15 Give a review of troubleshooting in beverage industry
3.16 Discuss the processes involved in traditional beverage production
3.17 Discuss in details the quality control in beverage industry
3.18 Discuss the role of plant sanitation in beverage industry
3.19 Discuss raw material handling and storage of beverage industry.

4. UNDERSTAND THE RECENT ADVANCES IN BEVERAGE TECHNOLOGY

4.1 Discuss in detail the advancements made in beverage technology
4.2 Discuss the role of bio technology in advancement of beverage industry

FPPT 323 BEVERAGES PROCESSING TECHNOLOGY.

LIST OF PRACTICALS **96 hours**

1. Water treatment
2. Preparation of fruit juices
3. Preparation of vegetable juices
4. Preparation of tea
5. Preparation of carbonated beverages
6. Preparation of non-carbonated beverages
7. Preparation of fermented beverages
8. Chemical analysis of beverages
9. Visit to beverage industry
10. Carbonation of juice
11. Bottling of juice
12. Determination of water quality

FPPT 332 FOOD PACKAGING

Total Contact Hours

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

AIM: The student will be able to understand various types of packaging material and there use in food processing and preservation industry.

COURSE CONTENTS

1. INTRODUCTION **4 hours**

- 1.1 Historical background
- 1.2 Reasons for packaging
- 1.3 Graphics and design

2. FUNCTIONS OF PACKAGING **10 hours**

- 2.1 Transportation
- 2.2 Protection
- 2.3 Identification
- 2.4 Nature of product

3. TYPES OF PACKAGING **10 hours**

- 3.1 Conventional
- 3.2 Modern
- 3.3 Aseptic packaging
- 3.4 Types of packaging materials
- 3.5 Principles of package design
- 3.6 Harmful effects

4. RECENT TRENDS IN PACKAGING **8 hours**

- 4.1 Retortable packaging
- 4.2 Aseptic packaged food
- 4.3 Free oxygen scavenging packaging
- 4.4 Frozen food and oven proof trays
- 4.5 Gas exchange packaging
- 4.6 Vaccum packaging
- 4.7 Lamination and coating technology

RECOMMENDED BOOKS

1 S. Sacharow and R.C. Griffin Jr., Principles of Food Packaging, AVI, Westport

2 R.C. Griffin and S. Scharow, Principles of Package Development, AVI, Westport

3 N.T. Crosby, Food Packaging Materials. Applied Science Publishers, London.

4 T. Kadoya, Food Packaging. Acadamic Press New York.

FPPT 332 FOOD PACKAGING

INSTRUCTIONAL OBJECTIVES

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

1. UNDERSTAND HISTORY OF FOOD PACKAGING

1.1 Define packing and packaging
1.2 Differentiate between packing and packaging
1.3 Describe historical background of food packaging
1.4 Explain reasons of packaging foods

2. UNDERSTAND FUNCTIONS OF PACKAGING

2.1 Enlist important functions of packaging
2.2 Describe functions of packaging
2.3 Explain the role of packaging as a means of identification, consumer appeal and information
2.4 Explain the effect of nature of product on marketing arrangements and form of packaging material.

3. UNDERSTAND THE TYPES OF PACKAGING MATERIALS

3.1 Enlist types of packaging materials
3.2 Describe properties of packaging materials
3.3 Identify conventional packaging materials
3.4 Explain conventional packaging materials
3.5 Identify modern packaging materials
3.6 Explain modern packaging materials
3.7 Define aseptic packaging
3.8 Explain the characteristicsof aseptic packaging paper
3.9 Explain the working of aseptic filling machine (Tetra Pak)
3.10 Explain bag-in-box system of packaging
3.11 Enlist types of packages and classify them into rigid, semi-rigid and flexible
3.12 Explain principles of packaging designs used in food industry
3.13 Illustrate the economy of packaging
3.14 Describe the harmful effects of packaging materials.

4. UNDERSTAND THE RECENT TRENDS IN PACKAGING

4.1 Explain what are the various techniques of packaging
4.2 Explain Retort able packaging
4.3 Explain Aseptic packaged food
4.4 Explain Free oxygen scavenging packaging
4.5 Explain Frozen food and oven proof trays
4.6 Explain Gas exchange packaging
4.7 Explain Vacuum packaging
4.8 Explain Lamination and coating technology

FPPT 332 FOOD PACKAGING

LIST OF PRACTICAL 96 hours

1. Visit to a can manufacturing plant
2. Visit to a paper packaging production unit
3. Visit to a multi-layer packaging production unit
4. Visit to a glass manufacturing plant
5. Visit to a large food warehouse
6. Familiarization with can testing equipment
7. Examination of can seams
8. Examination of cans for defects
9. Collection of various types of packages and materials
10. Examine laminates
11. Read information on the label
12. Testing materials and packages
13. Preparation of tin can
14. Estimation of shelf life of fresh and preserved food using various packages
15. Prepare Vaccum packaging of any food

FPPT 382 QUALITY CONTROL

Total Contact Hours

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

AIM: The student will be able to understand the general principles of quality control and quality management in the food processing industry..

COURSE CONTENTS

1. INTRODUCTION **2 hours**
- 1.1 Concept of quality control
- 1.2 Need for quality control and quality assurance
- 1.3 Sanitation and hygiene

2. SENSORY EVALUATION **4 hours**
- 2.1 Principles of sensory evaluation
- 2.2 Methods of sensory evaluation
- 2.3 Selection and training of panelists
- 2.4 Purpose of panelists

3. PHYSICAL AND CHEMICAL QUALITY **4 hours**
- 3.1 Physical quality and its parameters
- 3.2 Chemical quality and its parameters

4. MICROBIOLOGICAL QUALITY OF FOODS **8 hours**
- 4.1 Microbiology of different foods
- 4.2 Hazard analysis critical control points (HACCP)

5. QUALITY CONTROL DEPARTMENT **8 hours**
- 5.1 Functions of Quality Control Departments
- 5.2 Relationship between Quality Control and other Departments
- 5.3 Statistical methods for quality control and improvement
- 5.4 Benefits of statistical quality control

6. QUALITY ASSURANCE STANDARDS **6 hours**
- 6.1 Total Quality Management
- 6.2 ISO-9000 Standards in Food Industry
- 6.3 New approaches to quality assurance

FPPT 382 FOOD QUALITY CONTROL

INSTRUCTIONAL OBJECTIVES

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

1. INSTRUCTIONAL OBJECTIVES.

1.1 Describe the concepts of quality control
1.2 Illustrate the needs of quality control and quality assurance
1.3 Differentiate between quality control and quality assurance
1.4 Discuss good practices in maintaining sanitation and hygene

2. UNDERSTAND THE METHODS OF SENSORY EVALUATION

2.1 Define sensory evaluation
2.2 State the principles of sensory evaluation
2.3 Describe the methods of sensory evaluation
2.4 Give the purpose of panelists

3. UNDERSTAND PHYSICAL AND CHEMICAL PARAMETERS

3.1 Describe the physical parameters of foods
3.2 Describe the chemical parameters of foods
3.3 Discuss the effects of processing on physical and chemical properties of foods

4. UNDERSTAND MICROBIOLOGICAL QUALITY OF FOODS

4.1 Describe the microbiology of milk and juices
4.2 Explain the importance of HACCP in food industry
4.3 Explain the effect of employee's health on the quality of product.

5. UNDERSTAND THE FUNCTION OF QUALITY CONTYROL DEPARTMENT

5.1 Explain the responsibilities of quality control department
Enlist functions of quality control department
Discuss the relationship of quality control department with other
departments of organization.
Describe the statistical methods of quality control
Explain the benefits of statistical methods in quality control.

6. UNDERSTAND THE CONCEPTS OF QUALITY ASSURANCE STANDARD

Describe the concept of total quality management
Explain ISO-9000 standards and their application
Describe the effects of total quality of foods

Explain how ISO-9000 can help to increase the export of food products

Discuss new approaches to quality assurance

FPPT 382 QUALITY CONTROL

LIST OF PRACTICALS **96 hours**

1. Determination of suspended and settleable wastes
2. Determination of BOD
3. Calculation of COD
4. Visit to a bio gas plant
5. Visit to a food plant to see waste treatment plant
6. Visit to local municipal waste water facilities
7. Utilization of wastes for preparation of animal feed
8. Utilization of wastes for the preparation of fertilizer

FPPT 392 WASTE MANAGEMENT

Total Contact Hours

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

AIM: The student will be able to understand food industry waste and methods employed in its treatment, utilization and disposal.

1. INDUSTRIAL WASTES **2 hours**

1.1 Definitions of wastes and by- products
1.2 Nature and classification of wastes

2. SOLID WASTE MANAGEMENT **6 hours**

2.1 Characteristics
5.2 Separation
5.3 Recycling
5.4 Utilization

3. LIQUID WASTE MANAGEMENT **4 hours**

3.1 Characteristics
3.2 BOD, COD
3.3 Toxic chemicals in effluents

4. METHODS OF LIQUID WASTE TREATMENT **12 hours**

4.1 Physical Methods
4.2 Chemical Methods
4.3 Biological Methods

5. ENVIRONMENTAL POLLUTION **8 hours**

5.1 Definition
5.2 Air and noise pollution
5.3 Land pollution
5.4 Water pollution
5.5 Role of Environmental Protection Agency

FPPT 392 WASTE MANAGEMENT

INSTRUCTIONAL OBJECTIVES

On completion of this course, the students will be able to

1. KNOW VARIOUS WASTES FROM FOOD INDUSTRY

1.1 Define waste and by-products
1.2 Enlist types of wastes
1.3 Classify wastes into solid and liquid

2. UNDERSTAND SOLID WASTE MANAGEMENT

2.1 Describe characteristics of solid wastes
2.2 Discuss separation of solid wastes
2.3 Discuss utilization of wastes as food and feed through the production of biomass or single cell protein
5.5 Discuss uses of wastes as fuel through the production of biogas
5.6 Discuss uses of wastes as fertilizer
5.7 Discuss uses of wastes for other purposes

3. UNDERSTAND THE MANAGEMENT OF LIQUID WASTE

3.1 List different types of insoluble wastes
3.2 Discuss the effect of insoluble wastes on eco-system
3.3 Discuss the methods of liquid waste disposal
3.4 Estimate total organic matter in wastewater.
3.5 Calculate B.O.D. and C.O.D.
3.6 List possible chemical and biochemical toxic substances in effluents from food processing plants

4. UNDERSTAND THE METHODS OF LIQUID WASTE TREATMENT

5.8 State the physical treatment by sedimentation, centrifugation, concentration, flotation, adsorption and ultra filtration
5.9 Explain the physical treatment by each of the above methods.
5.10 State the principle used in chemical treatment by coagulation, emulsion breaking, neutralization, precipitation and oxidation
5.11 Explain the biological treatment by each of the above processes
5.12 Explain the biological treatment by activated sludge process,

5.13 Explain the biological treatment by trickling filter.
5.14 Explain the biological treatment by aerated lagoons
5.15 Explain the biological treatment by stabilization ponds
5.16 Explain the biological treatment by anaerobic process.

5. UNDERSTAND ENVIRONMENTAL POLLUTION

5.1 Define and identify sources of environmental pollution
5.2 Enlist different types of pollutants
5.3 Discuss possible chemical and biological toxic substances in air
5.4 Describe methods of air pollution prevention
5.5 Enlist sources of noise pollution
5.6 Discuss effect of noise pollution on personnel
5.7 Describe control method for noise pollution
5.8 Discuss the sources of land pollution
5.9 Discuss the effect of pollution on eco-system
5.10 List water pollutants
5.11 Discuss effect of water pollution on aquatic life
5.12 Explain the role of EPA in controlling the environmental pollution

FPPT 392 WASTE MANAGEMENT

LIST OF PRACTICALS 96 hours

1. Set up of a quality control lab
2. Performance of sensory evaluation
3. Practice using different sensory evaluation methods
4. Physical examination of selected foods
5. Examination of selected foods by chemical analysis
6. Microbiological analysis of water
7. Microbiological examination of selected foods
8. Practice of applying statistical methods in quality control parameters in any food processing industry
9. Visit to a food industry quality control lab
10. Quality control analysis of milk

FPPT 353 FOOD ENGINEERING

Total Contact Hours

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

AIM: The course is aimed at enabling the students to develop proficiency in basic engineering involved in food processing and preservation industries.

COURSE CONTENTS

1. UNIT OPERATIONS 14 hours

1.1 Introduction to unit operations in food industry
1.2 Concept of each unit operations in food industry i.e. cleaning, sorting, separation, grading, centrifugation, filtration, crystallization, extraction, pressing, sterilization, evaporation, heat transfer, freezing, irradiation, mixing, etc.
1.3 Basic laws of energy and material balance
1.4 Generalized flow diagram of a food processing operation

2. FLUIDS 8 hours

2.1 Definition and types
2.2 Mechanism of fluid flow
2.3 Fluid statics, fluid dynamics
2.4 Reynolds number
2.5 Viscosity
2.6 Bernoullie's theorem
2.7 Fluid heads, friction losses
2.8 Friction in pipes, enlargement and contraction losses

3. MEASUREMENT OF FLUIDS 6 hours

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

4. PUMPS 10 hours

4.1 Terminology of pumps
4.2 Types of pumps
4.3 Theory of compression, compressor selection
4.4 Construction and working of compressors

5. HEAT TRANSFER 10 hours

5.1 Modes of heat transfer, Fourier law

5.2 Thermal conductivity, pipe insulation
5.3 Film coefficient
5.4 Heat transfer coefficient
5.5 Factors affecting heat transfer coefficients
5.6 Classification of heat transfer equipment
5.7 Heat exchangers

6. EVAPORATORS 8 hours

6.1 Basic principles of evaporation
6.2 Types of evaporators
6.3 Construction and working of evaporators
6.4 Methods of feeding
6.5 Evaporator accessories
6.6 Economy and capacity

7. EVAPORATOR PROBLEMS 4 hours

7.1 Scale formation and its removal
7.2 Steam tables and their use, choice of steam pressure
7.3 Trouble shooting

8. PROPERTIES OF MATERIALS USED IN FOOD ENGINEERING 4 hours

8.1 Metals/ Alloys (stainless steel, copper, aluminum)
8.2 Glass
8.3 Plastics
8.4 Polymers
8.5 Corrosions of metals and their protection

RECOMMENDED BOOKS

1. W.L. Bedger and J. T. Bencharo, Introduction to Chemical Engineering.
2. R.T. Toledo, Fundamentals of Foods Process Engineering, AVI, Westport.
3. K.L. Earle, Unit Operations in Food Processing, Pergamon Press, Oxford.
4. P. Fellows, Food Processing Technology, Ellis Horwood, Chichester.
5. Stanly Charm, Fundamentals of Food Engineering, AVI Publishing Westport
6. S. Herkal, Basic Engineering Principles, AVI Publishing Westport
7. M. Lemoguer & P. Jelen, Food Engineering & Process Applications, Elsevier Publishing Co.
8. D.R. Heldman, Food Process Engineering, AVI Publishing Westport

FPPT 353 FOOD ENGINEERING

INSTRUCTIONAL OBJECTIVES

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

1. UNDERSTAND UNIT OPERATIONS IN FOOD ENGINEERING

1.1 Define food engineering
1.2 Explain unit operations with examples
1.3 Explain examples of unit processes using flow diagrams
1.4 Identify the principle unit operations relative to handling and preparation of food raw materials
1.5 List and discuss the principles involved in preservation operation
1.6 Describe dry and wet cleaning operations in food industry
1.7 Discuss the principle of sorting machine
1.8 Describe the principles working of various machines used in separation and grading operations in food industry
1.9 Briefly discuss centrifugation
1.10 Discuss principles and application of various types of filters in food industry
1.11 Introduce the theory and function of crystallization in food industry
1.12 Discuss the theory and functions of various extractors used in food industry
1.13 Discuss theory, equipment and application of sterilization, evaporation, dehydration, freezing, lyophilization operation for preservation of foods
1.14 Explain different types of mixing techniques
1.15 Give a brief introduction to mixing equipments commonly used in food industry
1.16 Explain Laws of material and energy balance

2. UNDERSTAND FLUIDS

2.1 Define and state types of fluids
2.2 Differentiate between Newtonian and Non-Newtonian fluids
2.3 Define fluid statics
2.4 Derive relationship to calculate the pressure exerted by liquid column

2.5 Define fluid dynamics
2.6 Define viscosity and its units
2.7 Explain the mechanism of fluid flow by Reynolds experiment
2.8 Differentiate between laminar flow and turbulent flow
2.9 Explain critical velocity of flowing fluids
2.10 Differentiate between point velocity, maximum velocity and mean velocity of flowing fluids
2.11 Explain Bernoullis Theorem
2.12 Develop mathematical equation for Bernoullis Theorem
2.13 Explain fluid heads
2.14 Enlist friction losses and calculate the head loss due to friction,l enlargement and contraction

3. UNDERSTAND THE MEASUREMENT OF FLUIDS

3.1 Define measurement of fluids and enlist equipment
3.2 Differentiate between various types of manometers
3.3 Describe working of U-tube, differential and inclined manometers
3.4 Calculate pressure drop from manometer readings
3.5 Describe working installation method of Orifice meter, Venturi meter, pitch tube, Rota meter and Weirs.

4. UNDERSTAND THE WORKING OF PUMPS

3.7 Define pumps
3.8 Explain the terminology used in pumps
3.9 Explain suction and discharge heads
3.10 Enlist types of pumps
3.11 Describe the working of centrifugal, positive displacement, reciprocating, plunger, diaphragm, gear, cycloidal and turbine pumps
3.12 Enlist factors considered in the selection of a pump
3.13 Enlist pump losses
3.14 Define blowers
3.15 List types of blowers
3.16 Explain working of cycloidal, Nash Hytor an centrifugal blowers
3.17 Define compressors
3.18 Explain working principle of reciprocating and centrifugal compressors
3.19 Enlist factors considered for the selection of a compressor

5. UNDERSTAND THE TRANSFER OF HEAT

Define heat and enlist modes of heat transfer
Explain conduction, convection and radiation

State Fouriers Law and gives its mathematical form
Give units of thermal conductivity
Describe the effect of temperature on thermal conductivity
State Newtons Law of heat convection
Explain film coefficients
Enlist factors affecting overall heat transfer coefficient
Understand temperature drop in flowing fluids
Differentiate between co-current flow
Make calculations related to conduction, convection and radiation
State Stefen Holtzmannl Law of heat radiation
Explain black body and grey body
Define and classify heat exchangers
Explain the construction and working of double pipe and plate heat exchangers

6. UNDERSTAND DIFFERENT TYPES OF EVAPORATORS

6.1 Define evaporation and enlist types of evaporators
6.2 Explain working of horizontal tube, climbing film, falling film and multiple effect evaporators
6.3 Describe evaporator accessories
6.4 Enlist types of condensers and explain the working of contact condenser
6.5 Explain the working of a steam ejector and enterainment separator
6.6 Explain economy and capacity of a multiple effect evaporator
6.7 Make calculations related to evaporator
6.8 Explain the use of steam table and calculate the amount of steam required for evaporating a given sample

7. UNDE4RSTAND EVAPORATOR PROBLEMS

7.1 List the problems of evaporators
7.2 Explain the effect of non-condensed gases and their removal
7.3 Explain scale formation, its effects and removal
7.4 Explain trouble shootings in the operation of evaporator and their remedies

8. UNDERSTAND FOOD ENGINEERING MATERIALS

8.1 Identify various metals used in food processing equipment
8.2 Define and differentiate between metal and alloy
8.3 Describe types of steel
8.4 Explain corrosion and its protection
8.5 Explain the properties of glass to be used for food
8.6 Explain the properties of plastics and polymers useful for food

FPPT 353 FOOD ENGINEERING

LIST OF PRACTICALS

1 Draw flow diagrams of some food processing operations
2 Solving juice industry material balance problems
3 Solving dairy industry material balance problems
4 Solving sugar industry material balance problems
5 Solving cereals industry material balance problems
6 Solving fruits industry material balance problems
7 Solving vegetable industry material balance problems
8 Solution of energy balance and enthalpy problems
9 Operation of spray drier for fruit juice
10 Operation of spray drier for milk
11 Operation of spray drier for juice
12 Operation of spray drier for egg
13 Study the operating characteristics and performance of different pumps
14 Operation of drum drier for milk
15 Operation of drum drier for cereals
16 Visit to various food industries to observe the working of different unit operations involved in food processing and preservation

FPPT 362 **SPECIAL PROJECT**

Total Contact Hours				
Theory	**0**	**T**	**P**	**C**
Practical	**192**	**0**	**6**	**2**
Pre-requisite	**Qualified first year of study**			

AIM: The students will grasp the techniques for undertaking a study in the discipline and preparing a final written report.

COURSE CONTENTS

Each student will be assigned a special topic for research in the library, industry, laboratory or the field. He will be assigned to a supervisor. At the end of the project, the student will submit a written report and deliver an oral presentation

FPPT 362 **SPECIAL PROJECT**

INSTRUCTIONAL OBJECTIVES

At the end of this course the student will be able to:

1 APPLY KNOWLEDGE

Apply the knowledge from the study of the discipline into his practical life

2 UNDERTAKE ASSIGNMENTS

Acquire the techniques to undertake assignments in his discipline.

3 PRESENT REPORT

Present results of assignments in written as well as oral form

FPPT 372 FOOD PLANT LAYOUT AND HYGIENE

Total Contact Hours

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

AIM: At the end of the course the students will be able to understand layout and hygiene of food processing plant and their environment.

COURSE CONTENTS

1. INTRODUCTION **10 hours**

1.1 Significance.
1.2 Selection of site
1.3 Design and construction of building
1.4 Layout of equipment
1.5 Good Manufacturing Practices (GMP)
1.6 Microbiology in food plant sanitation

2. PLANT CLEANING **12 hours** 2.1

2.1 Need for cleaning
2.2 Dismantling cleaning
2.3 Requirements of aseptic packaging
2.4 Factors affecting degree of cleaning
2.5 Disinfectants and detergents

3. SANITARY FACILITIES **10 hours**

3.1 Required facilities
3.2 Field sanitation
3.3 Food grade steam and water

RECOMMENDED BOOKS

1. M.A. Joslyn and J.L. Heid, Food Processing Operations, AVI, Westport
2. W.C. Frazier & D.C. Westhoff, Food Microbiology, McGraw Hill Book Co., New York
3. J.G. Brennan, J.R. Butters, N.D. Cowell and A.E.V. Lilly. Food Engineering Operations.Elsevier Publishing Co. Limited, Amsterdam.

FPPT 262 FOOD PLANT LAYOUTS AND HYGIENE

INSTRUCTIONAL OBJECTIVES

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

1. UNDERSTAND THE IMPORTANCE OF PLANT LAYOUT

1.1 State the importance of food plant layout and hygiene
1.2 Explain the factors considered for site selection
1.3 Discuss the demerits of unsuitable site
1.4 Enlist the requirements for the building design
1.5 Illustrate the requirements for building construction
1.6 Explain the layout of equipment
1.7 Discuss draw backs of improper equipment layout
1.8 Explain good manufacturing practices and discuss their application
1.9 Identify microorganisms that can cause hazards
1.10 Explain the importance of microbiology in food plant sanitation
1.11 Discuss applications for maintaining good hygiene

2. UNDERSTAND THE PLANT CLEANING

2.1 State need for cleaning
2.2 State cleaning demands of batch and continuous operations
2.3 Explain dismantling cleaning
2.4 Describe the procedure of cleaning-in-place (CIP)
2.5 Explain the requirements of aseptic packing
2.6 Enlist factors affecting the degree of cleaning
2.7 Explain the mode of action of detergents

3. UNDERSTAND SANITARY FACILITIES

3.1 Enlist the facilities required for maintaining good sanitation in a food plant
3.2 State the need for field sanitation
3.3 Explain food grade steam and water

FPPT 262 FOOD PLANT LAYOUTS AND HYGIENE

LIST OF PRACTICALS **96 hours**

1. Examine lab and commercial equipment for features of hygienic design
2. Examine Departmental building for sanitary design and construction faults
3. Determination of levels of various disinfectants
4. Determination of water hardness
5. Determination of the effect of water hardness and organic matter on cleaning efficiency
6. Estimation of microbial load before and after cleaning
7. Visit to a food factory for observing water treatment process
8. Visit to local waste disposal system

MINIMUM QUALIFICATION OF TEACHER / INSTRUCTOR

- **Gazetted Posts**

  Qualification:
  B.Sc (Hons.) Food Technology / B.Sc (Hons.) Agri. Food Technology / B.Sc (Hons.) Dairy Technology.

- **Non-Gazetted Posts**

  Qualification: D.A.E. (Food Technology) / D.A.E. (Food Processing & Preservation Technology).

EMPLOYABLITY OF PASSOUTS

- Dairy Industry: (Nestle, Haleeb, Engro, Nirala, ete.)
- Beverages: (Pepsi Cola, Coca Cola, Amrat Cola, Shezan, Benz, Golden Juices, Maza, ete.)
- Fats & Oils: (Habeeb, Kashmir, Dalda, Manpasad, Tuloo, etc.)
- Confectionary: (Mitchell's, Mayfair, Candy-land, Hillal, etc)
- Meat Industry: (K &Ns Foods, Floury Meat, Knoor, etc.)
- Bread Industry: (Vita, Dawn, Bunny, etc.)
- Snack Industry: (Lays, Golden, Triple EM, etc)

LIST OF MACHINERY/TOOLS AND EQUIPMENT :

FOOD PROCESSING AND PRESERVATION TECHNOLOGY (DAE 3 YEARS)

S.NO	EQUIPMENTS/TOOLS/MACHINERY
1.	AUTOCLAVE
2.	AUTOMATIC KJELDHAL DIGESTION & DISTILLATION APPARATUS
3.	AUTOMATIC PIPPETTORS WITH DISPENSORS
4.	BOD APPARATUS WITH BOTTLES
5.	BOD INCUBATORS
6.	CENTRIFUGE100-5000RPM
7.	COD APPARATUS WITH HEATING DIGESTORS
8.	COD METER
9.	CONDUCTIVITY METER
10	DIGITAL COLONY COUNTER
11	DIGITAL ELECTRONIC BALANCE 4 DIGITS
12	ELECTRONIC TOP LOADING BALANCE(1 kg)
13	ELECTROPHORESIS
14	SIXHLAT APPARATUS
15	FLAME PHOTOMETER(K,Ca,Br,Na filters)
16	HAND REFRACTROMETER
17	HEATING MANTLE
18	HOT PLATE
19	INCUBATOR HEATING TYPE(115 L CAPACITY)
20	INCUBATOR COOLING TYPE
21	LABORATORY CENTRIFUGE
22	LABORATORY DIGITAL RAFRACTROMETER
23	LABORATORY OVEN
24	LAMINAR FLOW HOOD
25	MAGNETIC STIRRER
26	MAGNETIC STIRRER +HOT PLATE
27	PORTABLE COD TEST KIT
28	PORTABLE DISSOLVED OXYGEN METER AND OXYGEN ELECTRODE
29	PORTABLE PH METER
30	PORTABLE TDS METER

31	REFLUX APARATUS
32	STEAKING WIRE LOOP
33	DIGITAL THERMOMETER
34	THERMOMETER
35	TLC APPARATUS
36	UV-VISIBLE SPECTROPHOTOMETER
37	VACUUM PUMP
38	MICROSCOPES
39	MOISTURE DETERMINATION BALANCE
40	MUFFLE FURNACE
41	TURBIDITY METER
42	PH METER DIGITAL
43	POLARIMETER
44	PORTABLE APPARATUS BOD
45	VACUUM STERILIZER
46	WATER BATH
47	VISCOMETER
48	WATER DISTILLATION UNIT
49	SPRAY DRIER
50	DRUM DRIER
51	EVAPORATOR
52	DEHYDRATOR
53	DOUGH PROOFER
54	HOMOGENIZER
55	ROTARY WASHER
56	ABRASIVE PEELER
57	LYE PEELER
58	MANGO PEELER
59	FINE PULPER
60	ROSE HEAD MACHINE
61	MINCER
62	JUICE EXTRACTOR
63	JUICE EXTRACTOR MANNUAL
64	CAPPING MACHINE
65	STEAM BOILER
66	MILK CHILLER
67	SLICER MACHINE
68	JUICE BLENDER
69	DOUGH MIXING MACHINE
70	SEPERATOR MANNUAL
71	SIEVING SYSTEM

72	ICE CREAM MACHINE
73	EXHAUST BOX
74	STEAM BLANCHER

75	RICHARD MEISEL RM APPARATUS
76	EXTRUDER
77	AIR COMPRESSOR
78	ASSORTED RETORT CLAMPS
79	BUNSER BURNER
80	BURETTE CLAMPS
81	CONTAINERS FOR CULTURE MEDIUM
82	FIRE FIGHTING EQUIPMENT
83	FIRST AID KIT
84	FUNNEL STANDSHOLE BORING MACHINE FOR RUBBER STOPPERS
85	MEASURING SPOONS
86	PETRI DISHES
87	REFRIGERATOR
88	RELATIVE HUMIDITY METERS
89	RETORT CLAMPS
90	RUBBER STOPPER
91	STOP WATCH
92	TEST TUBE HOLDERS
93	TEST TUBE RACKS
94	TONGS
95	TRIPOD STAND
96	TUBING CLAMPS
97	TUBING CONNECTORS
98	HYDROMETER
99	LACTOMETER

LIST OF CONSUMABLE(GLASS WEAR AND CHEMICALS)

S.NO	GLASS WEAR
1.	AERATION BOTTLES
2	BEAKERS(100 TO 1000ml) plastic +glass
3	Brown glass bottle
4	Burrettes
5	Cover slips
6	Culture dishes
7	Culture flask
8	Depression slides
9	Desiccators
10	Distilled water containers
11	Filteration vaccum flask
12	Flask 1000 ml
13	Glass beads /boiling chips
14	Glass rods
15	Glassware drying racks
16	Measuring cylinders 50-500 ml
17	Microscope slides
18	Microscope slides (Prepared with yeast, bacteria and molds)
19	Pipette racks
20	Pippetts (1-50 ml)
21	Reagent bottles(plain & brown with glass stopers)
22	Round bottom flask (100-500 ml)
23	Rubber bulbs 100 ml
24	Soxhlet glassware

25	Test tubes (plain & screw type)
26	Titration flask
27	Volumetric flasks (50-1000 ml)
28	**CHEMICALS**
29	Acetic acid
30	Acetylene
31	Aluminum hydroxide suspension
32	Ammonium chloride
33	Ammonium hydroxide
34	Asbestos
35	Ascorbic acid
36	Borate buffer solution
37	Boric acid
38	Bromocresol purple
39	Bromocresol blue
40	Buffer tablets (pH 4.01 & 7.01)
41	Calcium chloride
42	Carbon tetrachloride
43	Chloroform
44	Congo red
45	Copper sulphate
46	Crystal violet
47	Diatomaceous earth
48	Diethyl ether
49	Ethyl alcohol
50	Ferric chloride
51	Ferrous sulphate
52	goaicol

53	Hydrocholoric acid concentrated
54	Hydrogen per oxide
55	Iso amyl alcohol
56	Iso propyl alcohol
57	Lead acetate
58	Mercuric sulphate
59	Methyl alcohol
60	methyl orange
61	Methyl red
62	Methylene blue
63	Ninhydrin
64	Nitric acid
65	Petroleum ether
66	phenopethalin
67	Phosphate buffer ph 7
68	Potassium sulphate
69	Potassium di chromate
70	Potassium dihydrogen phosphate
71	Potassium hydroxide
72	Potassium oxalate
73	Potassium permanganate
74	Silver sulphate
75	Sodium carbonate
76	Sodium chloride
77	Sodium hydroxide
78	Sodium sulphate
79	Sodium thio sulphate
80	Starch

81	Standard EDTA titrant
82	Sulfuric acid