CURRICULUM

For

THREE YEARS' DIPLOMA OF ASSOCIATE ENGINEER

IN

FOOD TECHNOLOGY

Entry Level: -   Matriculation (Science)

Duration of Course: -   Three - Years

Credit Hours: SIXTY-EIGHT (Annual System)

Methodology: Theory 40%

                                        Practical 60 %

Examination & Certification Body: Punjab Board of Technical Education

Examination System: Annual System (same as for all the DAEs programs)

Technical Education and Vocational Training Authority

TEVTA

DAE in FOOD TECHNOLOGY (Revised)

SCHEME OF STUDIES

FIRST YEAR

			T	P	C	Total(T+P)
Gen	111	Islamiat/Pakistan Studies	1	0	1	32
Eng	112	English	2	0	2	64
Comp	142	Computer Applications	1	3	2	128
Ch	123	Applied Chemistry	2	3	3	160
Phy	113	Applied Physics	2	3	3	160
Math	123	Applied Mathematics-I	3	0	3	96
MTF	111	Engineering Drawing	0	3	1	96
MTF	121	Workshop Practice	0	3	1	96
FT	103	Introduction to Food Science and Technology	2	3	3	160
FT	123	General and Food Microbiology	2	3	3	160
		T o t a l	**15**	**21**	**22**	

SECOND YEAR

			T	P	C	
Gen	211	Islamiat / Pakistan Studies	1	0	1	32
Mgm	221	Business Management and Industrial Economics	1	0	1	32
Math	233	Applied Mathematics-II	3	0	3	96
FT	203	Food Chemistry & Analysis	2	3	3	160
FT	223	Fruits, Vegetables & Beverage Technology	2	3	3	160
FT	232	Fats & Oils Technology	1	3	2	128
FT	243	Meat, Poultry & Fish Technology	2	3	3	160
FT	262	Food Plant Layout and Hygiene	1	3	2	128
FT	271	Food Packaging	1	0	1	32
FT	282	Sugar & Confectionery Technology	1	3	2	128
FT	291	Food Laws & Standards	1	0	1	32
		T o t a l	**16**	**18**	**22**	

THIRD YEAR

			T	P	C	
Gen	311	Islamiat / Pakistan Studies	1	0	1	32
Mgm	321	Business Communication	1	0	1	32
Mgm	311	Industrial Management & Human Relations	1	0	1	32
FT	313	Hospitality Management	2	3	3	160
FT	322	Nutrition & Dietetics	2	0	2	64
FT	303	Cereal & Baking Technology	2	3	3	160
FT	343	Dairy Technology	2	3	3	160
FT	353	Food Engineering	2	3	3	160
FT	363	Food Safety & Quality Assurance	2	3	3	160
FT	383	Waste Management	2	3	3	160
FT	391	Special Project	0	3	1	96
		T o t a l	**17**	**21**	**24**	

اسلامیات / مطالعہ پاکستان

	نی	بی	سی
حصہ اول اسلامیات GEN III

حصہ دوم مطالعہ پاکستان | 1 | 0 | 1 |

موضوعات حصہ اول اسلامیات   سال اول   کل وقت: 20 گھٹے

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 جمیعاً ولا تفرقو

1.3 ولا یجرمنکم شنان قوم علی ان لا تعدلوا

1.4 ان اللّٰہ یامرکم ان تؤدوا الامانات الی اھلھا

1.5 ان اللّٰہ یامر بالعدل والاحسان

1.6 ان الصلوٰة تنھی عن الفحشاء والمنکر

1.7 لقد کان لکم فی رسول اللّٰہ سوۃ حسنہ

3-1 انما الاعمال بالنیات

9-2 انما بعثت لاتمم مکارم الاخلاق

0-3 لا یومن احدکم حتی یحب لاخیہ ما یحب لنفسہ

1-4 المسلم من سلم المسلمون من لسانہ و یدہ

2-5 فی امنت باللّٰہ ثم استقم

5-6 خیرکم خیرکم لاھلہ

7-7 سباب المسلم فسوق و قتالہ کفر

8-8 المومن اخو المومن

9-9 کل المسلم علی المسلم حرام دمہ و عرضہ و مالہ و فرقہ

10-1 ایتہ المنافق ثلاث اذا حدث کذب و اذا وعد اخلف و اذا ائتمن خان

دین اسلام

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

1- توحید

2- رسالت

3- آخرت

4- ملا ئکہ

5- آسمانی کتب

2.2 عبادات

1- نماز 2- روزہ 3- حج 4- زکوٰة

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

حصہ اول

حصہ اسلامیات

تدریسی مقاصد

۱- قرآن مجید

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

خصوصی مقصد: طالب علم اس قابل ہو جائے گا کہ

☆ قرآن مجید کی تعریف کر سکے گا

☆ قرآن مجید کے نزول کی صورت بیان کر سکے

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

☆ منتخب آیات کا ترجمہ و تشریح کر سکے

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

☆ قرآنی آیات کا ترجمہ تشریح کر سکے

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

۲- سنت

عمومی مقصد: طالب علم سنت نبوی کی اہمیت اور ضرورت اور 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

۳- 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 اسوہ حسنہ کا رویہ اپنا کر کے مفید پیدا ہو سکے

4

دین اسلام

عمومی مقاصد: دین اسلامی 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

عبادات کے لفظی و اصطلاحی معنی بیان کر سکے

عقیدے اور عبادت کا فرق بیان کر سکے

عبادات (نماز، روزہ، حج، زکوٰۃ) کے فوری احکامات 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

DAE Technology

(اغیر مسلم طلباء کے لئے)

نصاب نخلاقیات سال اول   GEN 101   ن   ٹی   کا

حصہ دوم مطالعہ پاکستان   1   0   1

موضوعات   کل وقت - 20 گھنٹے

نخلاقیات کی تعریف اور اہمیت

نخلاقیات کا معیار (قانون: عقل، الہیٰ کتب)

مندرجہ ذیل نخلاق کی وضاحت

☆ دیانت داری

☆ وفہ داری

☆ نظم و نبط

☆ راست گوئی

☆ صبر و استقلاب

☆ حوصلہ مندی

☆ وقت کی پابندی

☆ ہمدردی

☆ ایثار

☆ والین احترام

☆ مصلحت

نصاب اخلاقیات (اسلامی لرن)

تدریسی مقاصد

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

خصوصی مقاصد :طالب اس علم سے اہل 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

☆ وراثت داری کی اہمیت بیان کر سکے

☆ وفاداری کی اہمیت بیان کر سکے

☆ نظم و ضبط کی افادیت بیان کر سکے

☆ صداقت بیان کی ضرورت بیان کر سکے

☆ حوصلہ مندی کے فوائد بیان کر سکے

☆ وقت کی پابندی کے فائدے بیان کر سکے

☆ صفائی امور باہمی اختیار سے حسن کارکردگی کو بیان کر سکے

☆ مصلحت کے فوائد بیان کر سکے

DAE Technology

حصہ دوئم   مضمون: پاکستان   کل وقت: 12 گھنٹے

موضوعات

۱. حریت فکر: مسلمان قوم میں آزادی فکر کی تاریخ، مسلمانوں میں سیاسی آزادی کی اہمیت محور ضرورت، ذہنی و جسمانی غلامی کے نقصانات

۲. نظریہ پاکستان

قیام پاکستان کی اساس: دو قومی نظریہ، قیام پاکستان کی غرض و غایت، نظریہ پاکستان کی وضاحت، نظریہ پاکستان اور علامہ اقبال اور قائد اعظم کے ارشادات کی روشنی میں

۳. نظریہ پاکستان کا تاریخی پسِ منظر

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

۴. تعلیمی تحریکیں

علی گڑھ، خلوت اسلامیہ، دیوبند، مدرسہ علم، اسلام، سندھ مدرسۃ الاسلامیہ کالج، پشاور، انجمن حمایت اسلام لاہور

مطالعہ پاکستان (حصہ دوئم)

تدریس کی 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

☆ بے مسلکی 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 قائد اعظم 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 :

☆ مجددین قیام 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

عہد الف ثانی کی علمی خدمات بیان کر سکے

شاہ ولی اللہ کی علمی خدمات بیان کر سکے

عہد الف ثانی اور شاہ ولی اللہ نے جو تبلیغ دین اور مبعلاروں میں سیاسی شعور پیدا کیا اسے بیان کر سکے

علمی تحریکیں

عمومی مقصد

برصغیر کی علمی تحریکوں سے آگاہی حاصل ہو سکے

خصوصی مقصد :

علی گڑھ - دیو بند - ندوۃ العلماء مدرسۃ السلام ، اسلامیہ کالج ، انجمن حمایت اسلام نے تعلیم کے ذریعہ سیاسی شعور مسلمانوں میں پیدا کیا اسے بیان کر سکے

آزادی ہند کے سلسلہ میں تحریک مجاہدین کی خدمات بیان کر سکے

Eng-112   ENGLISH

Total contact hours

		T	P	C
Theory	64			
Practical	0	2	0	2

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

COURSE CONTENTS

ENGLISH PAPER "A"

1.   PROSE/TEXT   16 hrs

1.1   First eight essays of Intermediate. English Book-II

2.   CLOZE TEST   4 hrs

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

ENGLISH PAPER "B"

3.   GRAMMAR   26 hrs

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

4.   COMPOSITION   8 hrs

4.1   Letters/Messages
4.2   Job application letter
4.3   For character certificate/for grant of scholarship
4.4   Telegrams, Cablegrams and Radiograms, Telexes, Facsimiles
4.5   Essay writing
4.6   Technical Education, Science and Our life, Computers, Environmental Pollution, Duties of a Student.   **4 hrs**

5.   TRANSLATION   6 hrs

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

RECOMMENDED BOOKS

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

Eng-112   ENGLISH

INSTRUCTIONAL OBJECTIVES
PAPER-A
1.   DEMONSTRATE BETTER READING, COMPREHENSION AND VOCABULARY
1.1   Manipulate, skimming and scanning of the text.
1.2   Identify new ideas.
1.3   Reproduce facts, characters in own words
1.4   Write summary of stories

2.   UNDERSTAND FACTS OF THE TEXT
2.1   Rewrite words to fill in the blanks recalling the text.
2.2   Use own words to fill in the blanks.

PAPER-B

3.   APPLY THE RULES OF GRAMMAR IN WRITING AND SPEAKING
3.1   Use rules of grammar to construct meaningful sentences containing a subjectand a predicate.
3.2   State classification of time, i.e. present, past and future and use verb tensecorrectly in different forms to denote relevant time.
3.3   Identify function words and content words.
3.4   Use marks of punctuation to make sense clear.
3.5 '   Relate what a person says in direct and indirect forms.
3.6   Compose his writings.
3.7   Distinguish between confusing words.

4.   APPLY THE CONCEPTS OF COMPOSITION WRITING TO PRACTICALSITUATIONS
4.1   Use concept to construct applications for employment, for character certificate for grant of scholarship.
4.2   Define and write telegrams, cablegrams and radiograms, telexes, facsimiles
4.3   Describe steps of a good composition writing.
4.4   Describe features of a good composition.
4.5   Describe methods of composition writing.
4.6   Use these concepts to organize facts and describe them systematically inpractical situation;

5.   APPLIES RULES OF TRANSLATION
5.1   Describe confusion.
5.2   Describe rules of translation.
5.3   Use rules of translation from Urdu to English in simple paragraph andsentences.

COMP-142　　　　　　　**COMPUTER APPLICATIONS**

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

Pre-requisite: None

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

Detail of Contents:

1. **Electronic data processing (E.D.P.)**　　　　　　**6 Hours**
   1.1　Basic Terms of Computer Science Data & itstypes, Information, Hardware, Software,Computer & its types

   1.2　Block diagram of a computer system
   1.3　BIT, Byte, RAM & ROM
   1.4　Input &Output devices
   1.5　Secondary storage devices
   1.6　Types of Software
   1.7　Programming Languages
   1.8　Applications of computer in different fields
   1.9　Application in Engineering, Education & Business

2. **MS-windows**　　　　　　**2 Hours**
   2.1　Introduction to Windows
   2.2　Loading & Shut down process
   2.3　Introduction to Desktop items (Creation of Icons, Shortcut, Folder & modify Taskbar)
   2.4　Desktop properties
   2.5　Use of Control Panel
   2.6　Searching a document

3. **MS-office (MS-word)**　　　　　　**8 Hours**
   3.1　Introduction to MS-Office
   3.2　Introduction to MS-Word & its Screen
   3.3　Create a new document
   3.4　Editing & formatting the text
   3.5　Saving & Opening a document
   3.6　Page setup (Set the Margins & Paper)
   3.7　Spell Check & Grammar
   3.8　Paragraph Alignment
   3.9　Inserting Page numbers, Symbols, Text box & Picture in the document
   3.10　Use the different Format menu drop down commands

(Drop Cap, Change Case, Bullet & Numbering and Border & Shading)
3.11   Insert the 'Table and it's Editing
3.12   Printing the document
3.13   Saving a document file as PDF format

4.   MS-office (MS-excel)   9 Hours
4.1   Introduction to MS-Excel & its Screen
4.2   Entering data & apply formulas in worksheet
4.3   Editing & Formatting the Cells, Row & Colum
4.4   Insert Graphs in sheet
4.5   Page setup, Print Preview & Printing
4.6   Types & Categories of Charts

5.   MS. Office (MS-power point)   4 Hours
5.1   Introduction to MS-Power point
5.2   Creating a, presentation
5.3   Editing & formatting a text box
5.4   Adding pictures & colors to a slide
5.5   Making slide shows
5.6   Slide Transition

6.   Internet   &   e-mail 3Hours
6.1   Introduction to Internet & browser window
6.2   Searching, Saving and Print a page from internet
6.3   Creating, Reading & Sending E-Mail
6.4   Explain some advance features over the internet and search engines

Recommended Textbooks:

1.   Bible Microsoft Office 2007 by John Walkenbach
2.   Bible Microsoft Excel 2007 by John Walkenbach
3.   Bible Microsoft PowerPoint 2007 by John Walkenbach

COMP-142   COMPUTER APPLICATIONS

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

2. **Understand ms-windows**
   2.1 Explain Introduction to Windows
   2.2 Describe Loading & Shut down process
   2.3 Explain Introduction to Desktop items(Creation of Icons, Shortcut, Folder & modify Taskbar)
   2.4 Explain Desktop properties
   2.5 Describe Use' of Control Panel (add/remove program, time & date, mouse and create user account)
   2.6 Explain the method of searching a document

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

4. **Understand ms-office (MS-excel)**
   4.1 Explain Introduction to MS-Excel & its Screen

4.2   Describe Entering data & apply formulas in worksheet
4.3   Describe Editing &Formatting the, Cells, Row & Column
4.4   Explain Insert Graphs in sheet
4.5   Describe Page setup, Print preview & Printing
4.6   Explain in details formulas for sum, subtract, multiply, divide, average
4.7   Explain in details the types of charts e.g pie chart, bar chart

5.   Understand ms-office (MS-power point)

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

6.   Understand internet &e-mail

6.1   Explain Introduction to Internet and browser window
6.2   Explain Searching, Saving and Print a page from internet
6.3   Describe Creating, Reading & Sending E-Mail and attachments
6.4   Explain some advance features over the internet and how to
          search topics on different search engines

COMP-142　　　　　**COMPUTER APPLICATIONS**

List of Practical:

1. **Identify key board, mouse, CPU, disk drives, disks, monitor, and printer** and
   　　　　　　　　　　　　　　　　　　　　　　　　　3Hrs

2. **MS WINDOWS XP**　　　　　　　　　　　　　　**12 Hrs**
   2.1　Practice of loading and shutdown of operating system

   2.2　Creating items (icons, shortcut, folders etc) and modifying taskbar
   2.3　Changing of wallpaper, screensaver, and resolution
   2.4　Practice of control panel items (add/remove, time and date, mouse, and create user account)

3. **MS OFFICE (MS-WORD)**　　　　　　　　　　　**27 Hrs**
   3.1　Identifying the MS Word Screen and its menu
   3.2　Practice of create a new document, saving and re-opening it from the location and spell check & grammar
   3.3　Practice of Page Formatting (Borders, Character Spacing, Paragraph, Bullets & Numberings and Fonts)
   3.4　Practice of different tool bars like standard, format & drawing tool bars
   3.5　Practice of Insert pictures, clipart, and shapes
   3.6　Practice of header and footer
   3.7　Practice of insert table and also format of table
   3.8　Practice of page setup, set the page margins, and printing documents

4. **MS OFFICE (MS-EXCEL)**　　　　　　　　　　　**27 Hrs**
   4.1　Identifying the MS EXCEL Screen and its menu
   4.2　Practice of create a new sheet, saving and re-opening it from the location and spell check
   4.3　Practice of insert and delete of row and columns (format of cell)
   4.4　Practice of entering data and formulas in worksheet (Add, Subtract, Multiplying, and Divide & Average)
   4.5　Repeating practical serial number 04
   4.6　Practice of insert chart and its types
   4.7　Practice of page setup, set the page margins, and printing

5. **MS OFFICE (MS-POWER POINT)**　　　　　　　**15 Hrs**
   5.1　Identifying the MS POWER POINT Screen and its menu
   5.2　Practice of create a new presentation and save
   5.3　Practice of open saves presentations
   5.4　Practice of inset picture and videos

6. **INTERNET & E-MAIL**　　　　　　　　　　　　**12 Hrs**
   6.1　Identifying internet explorer
   6.2　Practice of searching data from any search engine
   6.3　Practice of create an E-Mail account and how to send and receive E-mails, download attachments

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   **3hours**

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

3   ATOMIC STRUCTURE.   **4hours**

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.

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PHY-113   APPLIED PHYSICS

Total Contact Hours:

	T	P	C
Theory	64		
Practical	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   WAVE MOTION.   5 Hours
   5.1   Review Hook's law of elasticity
   5.2   Motion under an elastic restoring force
   5.3   Characteristics of simple harmonic motion
   5.4   S.H.M. and circular motion
   5.5   Simple pendulum
   5.6   Wave form of S.H.M.
   5.7   Resonance
   5.8   Transverse vibration of a stretched string

6   SOUND.   5 Hours
   6.1   Longitudinal waves
   6.2   Intensity, loudness, pitch and quality of sound
   6.3   Units of Intensity, of level and frequency response of ear
   6.4   Interference of sound waves, silence zones, beats
   6.5   Acoustics
   6.6   Doppler effect.

7   LIGHT.   5 Hours
   7.1   Review laws of reflection and refraction.
   7.2   Image formation by mirrors and lenses
   7.3   Optical instruments
   7.4   Wave theory of light
   7.5   Interference, diffraction, polarization of light waves
   7.6   Applications of polarization of light waves

8   OPTICAL FIBER.   2 Hours
   8.1   Optical communication and problems
   8.2   Review total internal reflection and critical angle
   8.3   Structure of optical fiber
   8.4   Fiber material and manufacture
   8.5   Optical fiber - uses.

9   LASERS.   3 Hours
   9.1   Corpuscular theory of light
   9.2   Emission and absorption of light
   9.3   Stimulated absorption and emission of light
   9.4   Laser principle
   9.5   Structure and working of lasers
   9.6   Types of lasers with brief description.
   9.7   Applications (basic concepts)
   9.8   Material processing
   9.9   Laser welding
   9.10   Laser assisted machining
   9.11   Micro machining
   9.12   Drilling, scribing and marking

10 HEAT. 4 Hours

10.1 Review of calorimetric and gas laws and mode of transfer of heat

10.2 Thermal expansion of solids, liquids and gases

10.3 Heat of fusion, vaporization

10.4 Humidity, absolute and relative

10.5 Law of cooling

10.6 Thermoelectricity

10.7 Thermocouple.

11 THERMODYNAMICS. 4 Hours

11.1 Heat energy and internal energy

11.2 First law of thermodynamics & applications

11.3 Isometric and adiabatic processes

11.4 Efficiency of heat engine

11.5 Second law of thermodynamics (both statements)

11.6 Heat engine and refrigerator.

12 TRANSFER OF HEAT.

5 Hours

12.1 Review: Modes of transfer of heat

12.2 Emission and absorption of heat

12.3 Black body radiation

12.4 Laws of energy distribution

12.5 Planck's quantum theory

12.6 The photoelectric effects

12.7 X-ray, production, properties and uses

13 ELECTROMAGNETIC WAVES.

3 Hours

13.1 Magnetic held around a current carrying conduction

13.2 Electric field induced around a changing magnetic flux

13.3 Moving fields

13.4 Types of electromagnetic waves

13.5 Generation of radio waves

13.6 Spectrum of electromagnetic waves

14 ATOMIC NUCLEUS.

5 Hours

14.1 Structure of the nucleus

14.2 Radioactivity

14.3 Radioactive series

14.4 Transmutation of elements

14.5 The fission reaction

14.6 The fusion reaction

14.7 The nuclear reactor

15 NUCLEAR RADIATIONS.

5 Hours

15.1 Properties and integration with matter
15.2 Radiations detector
15.3 Radiation damage and its effects
15.4 Radiation therapy
15.5 Radioactive tracers
15.6 Application of radiation techniques in archeology, agriculture, chemical industry,

polymerization, sterilization, food preservation, gauging and control, radiography

16 ARTIFICIAL SATELLITES.

2 Hours

16.1 Review law of gravitation
16.2 Escape velocity
16.3 Orbital velocity
16.4 Geosynchronous and geostationary satellites
16.5 Use of satellites in data communication.

17 MAGNETIC MATERIALS.2 Hours

17.1 Magnetism
17.2 Domains theory
17.3 Para and ferromagnetism and magnetic materials
17.4 B.H. curve and hysterisis loop.

18 SEMI CONDUCTOR MATERIALS.

2 Hours

18.1 Crystalline structure of solids
18.2 Conductors, semiconductors, insulators
18.3 P-type and N-type materials
18.4 P-N junction
18.5 P-N junction as a diode
18.6 Photovoltaic cell (solar cell)

RECOMMENDED BOOKS:

1. Tahir Hussain, Fundamentals of physics Vol-I, II

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.   USE CONCEPTS OF WAVE MOTION IN SOLVING RELEVANT PROBLEMS.
  5.1   Explain Hooke's Law of Elasticity
  5.2   Derive formula for Motion under an elastic restoring force
  5.3   Derive formulae for simple harmonic motion and simple pendulum
  5.4   Explain wave form with reference to S.H.M. and circular motion
  5.5   Explain Resonance
  5.6   Explain transverse & longitudinal waves.
  5.7   Use the above concepts and formulae of S.H.M. to solve relevant problems.

6.   UNDERSTAND CONCEPTS OF SOUND.
  6.1   Describe longitudinal wave and its propagation
  6.2   Explain the concepts: Intensity, loudness, pitch and quality of sound

6.3   Explain units of Intensity level and frequency response of ear

6.4   Explain phenomena of silence zones, beats

6.5   Explain Acoustics of buildings

6.6   Explain Doppler effect giving mathematical expressions and its application

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

7.1   Explain laws of reflection and refraction

7.2   Use mirror formula to solve problems

7.3   Use the concepts of image formation by mirrors and lenses to describe working of optical instruments, e.g. microscopes, telescopes, cameras.

7   UNDERSTAND WAVE THEORY OF LIGHT.

7.1   Explain wave theory of light

7.2   Explain phenomena of interference, diffraction, polarization of light waves

7.3   Describe uses of polarization given in the course contents

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

9.1   Explain the structure of the Optical Fiber

9.2   Explain its principle of working

9.3   Describe use of optical fiber in industry and medicine.

10.   UNDERSTAND THE STRUCTURE, WORKING AND USES OF LASERS.

10.1   Explain the stimulated emission of radiation

10.2   Explain the laser principle

10.3   Describe the structure and working of lasers

10.4   Distinguish between types of lasers

10.5   Describe the applications of lasers in the fields mentioned in the course contents.

11.   UNDERSTAND CONCEPTS OF HEAT.

11.1   Explain calorimetric and modes of transfer of heat

11.2   Explain Gas laws giving mathematical expressions

11.3   Explain Thermal expansion of solids, liquids and gases

11.4   Distinguish between absolute and relative humidity

11.5   Distinguish between heat of fusion, vaporization

11.6   Explain Law of cooling

11.7   Explain basic concepts of Thermoelectricity

11.8   Describe Thermocouple, giving its principle, structure and working.

12.   UNDERSTAND LAWS OF THERMODYNAMICS.

12.1   Distinguish between heat energy and internal energy

12.2 Explain first law of thermodynamics giving its applications by defining Isothermal and adiabatic process

12.3 Distinguish between isometric and adiabatic processes

12.4 Explain second law of thermodynamics describing alternate statements

12.4 Distinguish between work of heat engine and refrigerator.

13. UNDERSTAND LAWS OF ENERGY DISTRIBUTION AND EMMISION RADIATION.

13.1 Explain modes of transfer of heat

13.2 Explain black body radiation and laws of energy distribution

13.3 Describe Planck's Quantum theory

13.4 Explain photoelectric effects

13.5 Explain production, properties and uses of x-rays

14. UNDERSTAND NATURE, TYPES, GENERATION AND SPECTRUM OF ELECTRO-MAGNETIC WAVES.

14.1 Explain magnetic field due to current and electric field due to changing magnetic flux

14.2 Explain moving fields

14.3 Describe types of electromagnetic waves

14.4 Explain generation of ratio waves

14.5 Explain spectrum of electromagnetic waves

15. UNDERSTAND THE STRUCTURE OF THE ATOMIC NUCLEUS AND RELEVANT ACTIVITIES.

15.1 Describe the structure of the nucleus

15.2 Explain Radioactivity and Radioactive series

15.3 Explain transmutation of elements

15.4 Distinguish between fission reaction and fusion reaction

15.5 Explain the structure and working of the nuclear reactor

16. UNDERSTAND NUCLEAR RADIATIONS THEIR EFFECTS AND USES.

16.1 Describe properties of nuclear radiations and their interaction with matter

16.2 Explain working of radiations detectors

16.3 Explain damaging effects of nuclear radiation

16.4 Explain radiations therapy

16.5 Describe radioactive tracers

17. UNDERSTAND TYPES AND USES OF ARTIFICIAL SATELLITES.

17.1 Explain escape velocity

17.2 Explain orbital velocity

17.3 Distinguish between geosynchronous and geostationary satellite

17.4 Describe uses of artificial satellite in data communications

18. UNDERSTAND BASIC CONCEPTS AND CLASSIFICATION OF MAGNETIC MATERIALS.

18.1 Explain domains theory of magnetism

18.2 Distinguish between Para, dia and ferromagnetism and magnetic materials

18.3   Distinguish between B and H

18.4   Describe B.H. Curve

18.5   Describe hysterisis loop.

19.   UNDERSTAND BASIC CONCEPTS OF SEMI-CONDUCTOR MATERIALS AND

THEIR USES.

19.1   Explain crystalline structure of solids

19.2   Distinguish between conductors, semi conductors and insulators

19.3   Describe semi conductors giving example with reference to their structure

19.4   Distinguish between P-type and N-type materials

19.5   Explain working of P-N junction as a diode

19.6   Explain working of solar cell

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PHY-113   **APPLIED PHYSICS**

LIST OF PRACTICAL   **96 Hours**

1.   Draw graph representing the functions:

   a) $Y = mx$ for m=0, 0.5, 1, 2

   b) $Y = X^2$

   c) $Y = 1/x$

2.   Find the volume of a given solid cylinder using vernier calipers.

3.   Find the area of cross-section of the given wire using micrometer screw gauge.

4.   Prove that force is directly proportional to (a) mass, (b) acceleration, using fletchers' trolley.

5.   Verify law of parallelogram of forces using Grave-sands apparatus.

6.   Verify law of triangle of forces and Lami's theorem

7.   Determine the weight of a given body using

   a)   Law of parallelogram of forces

   b)   Law of triangle of forces

   c)   Lami's theorem

8.   Verify law of polygon of forces using Grave-sands apparatus

9.   Locate the position and magnitude of resultant of like parallel forces

10.   Determine the resultant of two unlike parallel forces

11.   Find the weight of a given body using principle of moments

12.   Locate the centre of gravity of regular and irregular shaped bodies

13.   Find Young's Modules of Elasticity of a metallic wire.

14.   Verify Hook's Law using helical spring.

15.   Study of frequency of stretched string with length

16.   Study of variation of frequency of stretched spring with tension

17.   Study resonance of air column in resonance tube and find velocity of sound.

18.   Find the frequency of the given tuning fork using resonance tube.

19. Find velocity of sound in rod by Kundt's tube.

20. Verify rectilinear propagation of light and study shadow formation

21. Study effects of plane mirror on reflection

22. Compare the reflective indices of given glass slabs

23. Find focal length of concave mirror by locating centre of curvature

24. Find focal length of concave mirror by object and image method

25. Find focal length of concave mirror with converging lens

26. Find reflective index of glass by apparent depth

27. Find reflective index of glass by spectrometer

28. Find focal length of converging lens by plane mirror

29. Find focal length of converging lens by displacement methods

30. Find focal length of diverging lens using converging lens

31. Find focal length of diverging lens using concave mirror

32. Find angular magnification of an astronomical telescope.

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

34. Find angular magnification of a compound microscope

35. Study working and structure of camera

36. Study working and structure of sextant

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

38. Determine the specific heat of lead shots.

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

40. Find the heat of fusion of ice

41. Find the heat of vaporization.

42. Determine relative humidity using hygrometer

Math-123   APPLIED MATHEMATICS-I

Total Contact Hours   T   P   C
    Theory   96   3   0   3
    Practical   Nil

AIMS After completing the course, the students will be able to solve problems of Algebra, Trigonometry, Vectors, Boolean Algebra, Complex numbers and Analytic Geometry, develop skills in the use of mathematical instruments and acquire mathematical clarity and insight in the solution of technical problems.

COURSE CONTENTS

1.   QUADRATIC EQUATIONS   **6 hours**
    1.1   Standard Form
    1.2   Solution
    1.3   Nature of roots
    1.4   Sum and product of roots
    1.5   Formation
    1.6   Problems

2.   BINOMIAL THEOREM   **6 hours**
    2.1   Factorials
    2.2   Binomial expression
    2.3   Binomial co-efficient
    2.4   Statement
    2.5   The general term
    2.6   The binomial series
    2.7   Problems.

3.   PARTIAL FRACTIONS   **6 hours**
    3.1   Introduction
    3.2   Linear distinct factors case I
    3.3   Linear repeated factors case II
    3.4   Quadratic distinct factors case III
    3.5   Quadratic repeated factors case IV
    3.6   Problems

4.   FUNDAMENTALS OF TRIGONOMETRY   **6 hours**
    4.1   Angles
    4.2   Quadrants
    4.3   Measurements of angles
    4.4   Relation between sexagesimal and circular system
    4.5   Relation between length of a circular arc and the radian measure of its central angle
    4.6   Problems

5.   TRIGONOMETRIC FUNCTIONS AND RATIOS   **6 hours**
    5.1   Trigonometric functions of any angle
    5.2   Signs of trigonometric functions
    5.3   Trigonometric ratios of particular angles
    5.4   Fundamental identities
    5.5   Problems

6.   GENERAL IDENTITIES   **6 hours**
   6.1   The Fundamental Law
   6.2   Deductions
   6.3   Sum and difference formulae
   6.4   Double angle identities
   6.5   Half angle identities
   6.6   Conversion of sum or difference to products
   6.7   Problems

7.   SOLUTION OF TRIANGLES   **6 hours**
   7.1   The law of Sines
   7.2   The law of Cosines
   7.3   Measurement of heights and distances
   7.4   Problems

8.   VECTORS AND PHASORS   **12 hours**
   8.1   Scalars and Vectors
   8.2   The unit Vectors i, j, k
   8.3   Direction Cosines
   8.4   Dot product
   8.5   Cross product
   8.6   Analytic expressions for dot and cross products
   8.7   Phasors
   8.8   Significance of j operator
   8.9   Different forms
   8.10 Algebraic operations
   8.11 Problems

9.   COMPLEX NUMBERS   **9 hours**
   9.1   Introduction and properties
   9.2   Basic operations
   9.3   Conjugate
   9.4   Modulus
   9.5   Different forms
   9.6   Problems

10. BOOLEAN ALGEBRA AND GATE NETWORKS   **15 hours**
   10.1 Concept and basic laws
   10.2 Sums of product and product of sums
   10.3 Binary, decimals and octals, presentation of decimal numbers in BCD
   10.4 Interconversion of numbers
   10.5 OR Gates and AND Gates
   10.6 Logical Expressions and their simplification
   10.7 Demorgan's theorems
   10.8 NAND Gates and NOR Gates
   10.9 Problems

11. PLANE ANALYTIC GEOMETRY AND STRAIGHT LINE   **6 hours**
   11.1 Coordinate system
   11.2 Distance formula.
   11.3 Ratio formulas.

11.4   Inclination and slope of line.
        11.5   Slope formula.
        11.6   Problems.

12.   EQUATIONS OF THE STRAIGHT LINE   **6 hours**
        12.1   Some important forms
        12.2   General form
        12.3   Angle formula.
        12.4   Parallelism and perpendicularity
        12.5   Problems

13.   EQUATIONS OF THE CIRCLE.   **6 hours**
        13.1   Standard and Central forms of equation.
        13.2   General form of equation.
        13.3   Radius and coordinates of center.
        13.4   Problems

RECOMMENDED TEXT BOOK
1.   Applied Mathematics: Math-123, Developed by Nasir -ud-Din Mahmood, Sana-ullah
Khan, Tahir Hameed, Evaluated by Syed Tanvir Haider, Javed Iqbal, Vol - I, National Book
Foundation

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Math-123   APPLIED MATHEMATICS-I

INSTRUCTIONAL OBJECTIVES

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

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

3.   APPLY DIFFERENT METHODS FOR RESOLVING A SINGLE FRACTION INTO PARTIAL FRACTIONS USING DIFFERENT METHODS
   3.1   Define a partial fraction, a proper and an improper fraction.
   3.2   Explain all the four types of partial fractions.
   3.3   Set up equivalent partial fractions for each type.
   3.4   Explain the methods for finding constants involved.
   3.5   Resolve a single fraction into partial fractions.
   3.6   Solve problems involving all the four types.

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

5.   UNDERSTAND BASIC CONCEPTS AND PRINCIPLES OF TRIGONOMETRIC FUNCTIONS.
   5.1   Define the basic trigonometric functions/ratios of an angle as ratios of the sides of a right triangle.
   5.2   Derive fundamental identities.

5.3   Find trigonometric ratios of particular angles.

5.4   Draw the graph of trigonometric functions.

5.5   Solve problems involving trigonometric functions.

6.   USE TRIGONOMETRIC IDENTITIES IN SOLVING TECHNOLOGICAL PROBLEMS.

6.1   List fundamental identities.

6.2   Prove the fundamental law.

6.3   Deduce important results.

6.4   Derive sum and difference formulas.

6.5   Establish half angle,double and tripple angle formulas.

6.6   Convert sum or difference into product and vice versa.

6.7   Solve problems.

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

7.1   Define angle of elevation and angle of depression.

7.2   Prove the law of sines and the law of cosines.

7.3   Explain elements of a triangle.

7.4   Solve triangles and the problems involving heights and distances.

8.   UNDERSTAND PRINCIPLES OF VECTORS AND PHASORS

8.1   Define unit vectors i, j, k.

8.2   Express a vector in the component form.

8.3   Explain magnitude, unit vector, direction cosines of a vector.

8.4   Explain dot product and cross product of two vector.

8.5   Deduce important results from dot and cross product.

8.6   Define phasor and operator j.

8.7   Explain different forms of phasors.

8.8   Perform basic Algebraic operation on phasors.

8.9   Solve problems on phasors.

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

9.1   Define a complex number and its conjugate.

9.2   State properties of complex numbers.

9.3   Give different forms of complex numbers.

9.4   Perform basic algebraic operations on complex numbers.

9.5   Solve problem involving complex numbers.

10.   SOLVE TECHNICAL PROBLEMS USING PRINCIPLES OF BOOLEAN ALGEBRA

10.1   Explain fundamental concepts of boolean algebra

10.2   Explain binary numbers, octal numbers, decimal numbers and their interconversion.

10.3   Explain digital addition and multiplication and its applications to OR gates and AND Gates

10.4   Illustrate complimentation and inversion

10.5   Evaluate logical expression

10.6   List basic Laws of Boolean Algebra

10.7   Explain De-Morgan's theorem

10.8   Explain basic duality of boolean algebra

10.9   Derive boolean expression

10.10   Explain combination of GATES

10.11   Illustrate sum of products and product of sum
10.12   Derive product of sum expression
10.13   Explain NAND Gates and NOR Gates
10.14   Use the map methods for simplifying expressions
10.15   Explain sub-cubes and covering

11.   UNDERSTAND THE CONCEPT OF PLANE ANALYTIC GEOMETRY 11.1
Explain the rectangular coordinate system.
11.2   Locate points in different quadrants.
11.3   Derive distance formula.
11.4   Describe the ratio formula
11.5   Derive slope formula
11.6   Solve problems using the above formulae.

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

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

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,

FT 103   INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY

Total contact hours

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

AIM: The students will be able to understand and use the scientific basis of food spoilage and preservation.

COURSE CONTENTS

1   INTRODUCTION   **6 hours**
    1.1   Evolution in Food Science
    1.2   Food Science
    1.3   Food Technology
    1.4   Food Processing
    1.5   Differentiation between Food Science and Technology
    1.6   Role of a Food Technologist

2   CLASSIFICATION OF FOODS   **4 hours**
    2.1   Based on origin
    2.2   Based on perishability
    2.3   Based on pH value

3   SPOILAGE OF FOODS   **6 hours**
    3.1   Mode of food spoilage
    3.2   Autolysis
    3.3   Microbial activities
    3.4   Insects, rodents and birds
    3.5   Other factors

4.   PRINCIPLES OF FOOD PRESERVATION   **4 hours**
    4.1   Prevention or delay of autolysis
    4.2   Prevention or delay of microorganisms
    4.3   Control of pest activities
    4.4   Reduction of physical defects

5   USE OF HIGH TEMPERATURE   **10 hours**
    5.1   Cooking
    5.2   Blanching
    5.3   Pasteurization
    5.4   Sterilization
    5.5   Canning

6   USE OF LOW TEMPERATURE   **6 hours**
    6.1   Equipment and procedure
    6.2   Use of above freezing temperature

6.3		Use of below freezing temperature	

7   REMOVAL OR BINDING OF MOISTURE   **10 hours**
   7.1   Water in food
   7.2   Sun drying
   7.3   Dehydration
   7.4   Evaporation and concentration
   7.5   Freeze-drying
   7.6   Dehydro-freezing
   7.7   Intermediate moisture foods technology

8   USE OF FOOD ADDITIVES   **6 hours**
   8.1   Chemical additives as non- preservatives
   8.2   Chemical additives as preservatives

9   USE OF FERMENTATIONS   **8 hours**
   9.1   Objectives of fermentation
   9.2   Types of fermentation
   9.3   Fermented foods

10   USE OF IRRADIATIONS   **4 hours**
   10.1   Use of ultra violet radiation
   10.2   Use of ionizing radiation
   10.3   Effect of irradiations on foods

RECOMMENDED BOOKS
1.   J. A. Awan, Elements of Food Science and Technology, Virgos, Moon Plaza, Chiniot Bazaar, Faisalabad.
2.   Norman N. Potter, Food Science, AVI, Westport.

FT 103   INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY

INSTRUCTIONAL OBJECTIVES

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

1   UNDERSTAND THE BASICS OF FOOD SCIENCE & TECHNOLOGY
  1.1   Describe evolution in Food Science
  1.2   Define Food, Food Science, Food Technology and Food Processing
  1.3   Differentiate between Food Science and Technology
  1.4   Describe role of Food Technologist
  1.5   Describe the scope of Food Technology

2   UNDERSTAND THE CLASSIFICATION OF FOODS
  2.1   List various classes of foods
  2.2   Describe classes of foods based on their origin
  2.3   Classify foods on perishability
  2.4   Define stable, semi-perishable and perishable foods
  2.5   Classify foods on the basis of pH value
  2.6   Name the spoilage organisms associated with foods of different pH values

3   UNDERSTAND THE SPOILAGE OF FOODS
  3.1   Define food deterioration and spoilage
  3.2   Enlist spoilage agents
  3.3   Define autolysis
  3.4   Explain autolysis with examples
  3.5   Define enzyme
  3.6   State the role of enzymes in food spoilage
  3.7   Describe factors affecting enzyme activity
  3.8   Describe the role of microorganisms in food spoilage
  3.9   Describe deterioration of foods by insects, rodents and birds
  3.10   Describe effect of physical factors in food deterioration

4   UNDERSTAND THE PRINCIPLES OF FOOD PRESERVATION
  4.1   Explain the principle of food preservation by preventing or delaying autolysis
  4.2   Explain the principle of food preservation by preventing or delaying microbial activity
  4.3   Explain the principle of food preservation by preventing or delaying pest activity
  4.4   Explain the principles of food preservation by preventing or delaying physical defects

5   UNDERSTAND THE USE OF HIGH TEMPERATURE IN FOOD PRESERVATION
  5.1   State main objectives of cooking
  5.2   Define blanching
  5.3   Define Pasteurization
  5.4   Describe the types of pasteurization
  5.5   Define sterilization and commercial sterilization
  5.6   Differentiate LTLT, HTST and UHT
  5.7   Describe unit operations in canning

6. UNDERSTAND PRESERVATION BY USE OF LOW TEMPERATURE
   6.1   State objectives of cooling foods
   6.2   Explain the use of cold storage for food preservation
   6.3   Explain freezing of foods
   6.4   Describe types of freezing
   6.5   Describe the effect of freezing on food quality

7. UNDERSTAND THE REMOVAL AND BINDING OF MOISTURE FOR FOOD PRESERVATION
   7.1   Define drying and dehydration
   7.2   Enlist factors affecting drying of foods
   7.3   Describe sun drying of foods
   7.4   Describe dehydration procedure and equipment
   7.5   Describe evaporation and concentration processes for food preservation
   7.6   State procedure for freeze-drying
   7.7   Describe intermediate moisture foods technology

8. UNDERSTAND THE APPLICATIONS OF FOOD ADDITIVES
   8.1   Differentiate between food additive, food adulterant, food contaminant
   8.2   Describe the use of food additives for non-preservative applications
   8.3   Explain the use of food additives for preservation of foods
   8.4   Describe the factors affecting the effectiveness of food preservatives

9   UNDERSTAND THE USE OF FERMENTATION FOR PRESERVATION
   9.1   Define fermentation
   9.2   List important fermented foods
   9.3   Explain objectives of fermentation
   9.4   Enlist types of fermentations
   9.5   Describe the use of alcoholic fermentations
   9.6   Describe the production of vinegar by fermentation
   9.7   Describe the use of lactic acid fermentations

10   UNDERSTAND THE USE OF IRRADIATIONS
   10.1   Define food irradiation
   10.2   Explain the role of radiations in food preservation
   10.3   Discuss the changes in foods as a result of irradiation

FT 103   INTRODUCTION TO FOOD SCIENCE AND TECHNOLOGY

LIST OF PRACTICALS   **96 hours**

1   Visit to Food Technology Section of a national research institute

2   Visit to a local food industry

3   Pasteurization of milk

4   Canning of seasonal fruits

5   Canning of seasonal vegetables

6   Visit to a cold storage

7   Freezing of seasonal fruits

8   Freezing of seasonal vegetables

9   Visit to a Food Technology Department of a University

10   Sun-drying of seasonal fruits

11   Sun-drying of seasonal vegetables

12   Dehydration of seasonal fruits

13   Dehydration of selected vegetables

14   Visit to a local dehydration unit

15   Use of evaporator for liquid foods

16   Preservation of fruit juice/pulp by the use of food additives

17   Use of alcoholic fermentation

18   Preservation of fruits by lactic acid fermentation

FT 123   **GENERAL AND FOOD MICROBIOLOGY**

Total Credit Hours

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

Pre-requisite   Biology at SS Level

AIM: To acquaint the students with basics of food microbiology

COURSE CONTENTS

1. INTRODUCTION TO MICROBIOLOGY   **8 hours**

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

2. CHARACTERISTICS OF MICROORGANISMS   **8 hours**

     2.1   Bacteria
     2.2   Yeasts
     2.3   Moulds
     2.4   Viruses

3. GENERAL PRINCIPLES OF MICROBIAL SPOILAGE   **8 hours**

     3.1   Microbiological causes of food spoilage

     3.2   Characteristics of some spoilage organisms

     3.3   Factors affecting the growth of microorganisms in food

     3.4   Changes caused by microorganisms

4. PRODUCTION OF CULTURES FOR FOOD FERMENTATIONS   **8 hours**

     4.1   General principles of culture preparation and maintenance

     4.2   Techniques for culture preparation

     4.3   Bacterial cultures
     4.4   Yeast cultures
     4.5   Mould cultures

5. FOOD AS A SUBSTRATE FOR MICROORGANISMS   **8 hours**

     5.1   Nutrients
     5.2   Moisture
     5.3   Hydrogen ion concentration (pH)
     5.4   Oxidation reduction potential
     5.5   Inhibitory substances and biological structure

6. CONTAMINATION OF FOODS   **8 hours**

     6.1   From plants

6.2   From animals
6.3   From sewage
6.4   From soils
6.4   From water
6.5   From air
6.6   During handling and processing

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. MICROORGANISMS AND DISEASES   **8 hours**

8.1   Pathogens, virulence and infection
8.2   Resistance and immunity
8.3   Food and water-borne diseases
8.4   Food borne infections

8.5   Food-borne intoxications

8.6   Food poisoning

8.7   Investigation of food borne disease out break

RECOMMENDED BOOKS

1.   M. I. Pelczar, Jr. and R.D. Reid, Microbiology, McGraw Hill Book. Co.2.

2.   W.C. Frazier and D.C. Westhoff, Food Microbiology,McGraw Hill Book Co,

FT 123   **GENERAL AND FOOD MICROBIOLOGY**

INSTRUCTIONAL OBJECTIVES

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

1. UNDERSTAND THE HISTORICAL DEVELOPMENTS OF MICROBIOLOGY
   1.1   Define microbiology, microorganism and microscope
   1.2   Enlist earliest scientists who discovered Microbiology.
   1.3   Describe the role of Leuwenhoek, Koch, Smith, Pasteur, Fleming and Lister.
   1.4   Define cell
   1.5   Draw and differentiates between plant and animal cells
   1.6   Differentiate between prokaryotes and eukaryotes
   1.7   Define species, genus, tribe, family, order, class, phylum and kingdom
   1.8   Explain classification of microorganisms
   1.9   Describe the relationship between microbiology and Food Technology.

2. UNDERSTAND THE CHARACTERISTICS OF MICROORGANISMS
   2.1   Define and identify different types of bacteria
   2.2   Describe classification of bacteria on the basis of shape, temperature, oxygen and food demand.
   2.3   Describe the general characteristics of bacteria
   2.4   Enlist important genera of bacteria useful in Food Microbiology
   2.5   Define and describe general characteristics of yeast
   2.6   Describe the industrial importance of yeast
   2.7   Define and describe general characteristics of moulds
   2.8   Differentiate between bacteria, yeast and moulds
   2.9   Describe general characteristics of viruses

3. UNDERSTAND PRINCIPLES OF MICROBIAL SPOILAGE
   3.1   Define microbial spoilage
   3.2   List types of microbial spoilage
   3.3   Explain the factors affecting the growth of microorganisms in food
   3.4   Describe the chemical changes caused by microorganisms in food
   3.5   Identify microorganisms that can cause hazards.

4. UNDERSTAND THE PRODUCTION OF CULTURE FOR FOOD FERMENTATIONS
   4.1   Define culture and culture medium
   4.2   Describe the types of culture medium
   4.3   Describe general principles of culture preparation & maintenance
   4.4   Describe different techniques of culture preparation
   4.5   Explain pure and mixed cultures
   4.6   Describe the use of bacterial cultures in food industry
   4.7   Explain the use of yeast for bread and malt beverages
   4.8   Describe the use of mould cultures for cheese production

5. UNDERSTAND ROLE OF FOOD AS A SUBSTRATE FOR MICROORGANISMS
   5.1   Define pH

5.2 Explain the importance of pH for the growth of microorganisms
5.3 Describe the concept of water activity
5.4 Explain the mechanism of oxidation-reduction potential
5.5 Discuss different inhibitory substances present in food
5.6 Describe the importance of biological structure of food

6. UNDERSTAND THE MECHANISM OF CONTAMINATION OF FOODS

6.1 Identify species of microorganisms contaminating foods
6.2 Enlist sources of contaminating microorganisms from animals
6.3 Explain the mechanism of food contamination by sewage
6.4 Describe contamination of foods from soil
6.5 Discuss water as a source of contamination
6.6 Explain how microorganism in air cause contamination of foods
6.7 Discuss how contamination takes place during handling and processing

7. UNDERSTAND CONTROL OF MICROORGANISMS

7.1 Describe three principal reasons for practicing methods of microbial control
7.2 Describe briefly 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 Describe briefly the function of antibiotics

8. UNDERSTAND THE RELATIONSHIP OF MICROORGANISMS AND DISEASE

8.1 Define pathogens, virulence, infection, resistance and immunity
8.2 Enlist types of immunity
8.3 Explain beneficial role of immunity in nature
8.4 Enlist different infectious diseases common in man
8.5 Describe different types of bacterial diseases
8.6 Define food poisoning and infection
8.7 Give examples of bacteria for food-borne intoxications and infections
8.8 Explain Botulism and Salmonellosis
8.9 Describe non-bacterial food borne diseases
8.10 Explain the significance of Aflatoxin
8.11 Describe briefly methods for investigation of food-borne disease out breaks.

FT 123   **GENERAL AND FOOD MICROBIOLOGY**

LIST OF PRACTICALS
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. Staining reagents and procedures
7. Determination of TPC & E Coli in food samples
8. Identification of important food microbes
9. Preparation of culture media
10. Continuation of previous practicals
11. Examination of spoiled canned foods for possible microorganisms
12. Find optimum growth temperature for an organism
13. Determination of microbial load in different food samples
14. Perform swab and dilution tests for assessing cleaning efficiency

اسلامیات / مطالعہ پاکستان

	نی	نیا	نی
مضمون (سال دوم) | | | |
GEN 211 | 1 | 0 | 1 |
حصہ اول: اسلامیات | | | |
حصہ دوم: مطالعہ پاکستان | کل وقت: 20 گھنٹے | | |

موضوعات

1۔ سورۃ المومنون   آیت 1 تا گیارہ آیات کا مع ترجمہ

2۔ ذن منتخب محدیث مع ترجمہ و تشریح

☆ خیارکم من تعلیم القرآن و علمہ

☆ لا ایمان لمن لا امانتہ لہ ولا دین لمن لا عہدلہ

☆ وایاکم والظن ان الظن اکذب الحدیث

☆ من احدث فی امرنا ابتداما لیس منہ فھورد

☆ من حمل علینا السلاح فلیس منا

☆ انا و کافل الیتیم فی الجنتہ

☆ لا ضرر ولا ضرار فی الاسلام

☆ کلکم راع و کلکم راع و کلکم مسؤل عن رعیتہ

3۔ سیرۃ طیبہ

☆ گھی زندگی والدین بعثت ہجرت

☆ ملی زندگی مہاجرت غزوات (بمع غزوہ احد الاسباب و نتائج)

4۔ حضور صلی اللہ علیہ وسلم بحیثیت

☆ خطبہ حجتہ الوداع

معلم کل، سر پرور کو خاندان

5۔ اسلامی معاشرہ

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

جہاد کسب حلال مسجد (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 انصار کے ساتھ بیان کر سکے

☆   حضور ﷺ کی ہجرت کا واقع بیان کر سکے

☆   حضور ﷺ کی مدنی زندگی انصار سے بیان کر سکے

☆   حضور ﷺ کی بطور معلم خصوصیات بیان کر سکے

☆ حضورﷺ 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 قتل میں فرق بیان کر سکے

☆ جہاد کی مختلف اقسام بیان کر سکے

☆ افضل مسجد کی تعریف کر سکے

مسجد کی سابقہ حیثیت کو بحال کرنے کے بارے میں اقدامات کو بیان کر 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

عی	لی	کی
1	0	1

کل وقت: 72 گھنٹے

سال دوم

حصہ دوم

موضوعات

☆ دو قومی نظریہ

☆ تحریک پاکستان

☆ انڈین کانگریس

☆ مسلم لیگ

☆ تقسیم بنگال

☆ میثاق لکھنؤ

☆ تحریک خلافت

☆ سندھ کی تحریک

☆ تعلیمی ترقی

☆ سمپسن رپورٹ

☆ قائداعظم کے چودہ نکات

☆ خطبہ آلہ آباد

☆ انتخابات 1938ء اور انتقال اقتدار

☆ 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 مسائی بیان کر سکے

☆   آزادی ہند اور قیام پاکستان علامہ اقبال اور قائد اعظم کی مسائی 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

Result.pk

(غیر مسلم طلباء کے لئے)

نصاب اخلاقیات

سال: دوم

نظری: لی ۔ لیا ۔ کی

عملی: ا ۔ D ۔ ا

کل وقت: 20 گھنٹے

موضوعات

معاشرتی اقدار بلحاظ ہمسایہ ۔ 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

☆ مسلسل دوستی

☆ خلاقی شعور

☆ پاس آزادی

☆ کامل آگاہی

☆ تغیرات کو تحمل کرنا

☆ خود شناسی

DAE   Technology

<div dir="rtl">

نصاب اخلاقیات

سال دوم

تدریسی مقاصد

عمومی مقاصد :

طالب علم : اخلاقیات کی اہمیت و ضرورت سے سمجھ 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

تربیت برداشت ۔ قوت ارادی ۔ لگن جذبہ ۔ وسیع النظری ۔ بے غرضی ۔ انسان دوستی خفاظتی ۔ شعور ۔ پس سنواری ۔ کام لگائی اور خدا شناسی کی اہمیت بیان کر سکے

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

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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.   ENTERPRENEURIAL 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, IlmiKitabKhana, 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 organizational set up and objectives of IDBP.
    12.3 Explain organizational 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 YasinMinhas, Technical Mathematics Vol - I & II, IlmiKitabKhana, 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

FT 203   **FOOD CHEMISTRY & ANALYSIS**

Total Contact Hours

Theory	64		T	P	C
Practical	96		2	3	3
Pre-requisite	Ch 123				

AIM: To give the student knowledge of food components in relation to food processing and analysis

COURSE CONTENTS

1. **WATER**   **12 hours**
    1.1   Nature in foods
    1.2   Physical and chemical properties
    1.3   Hard and soft waters
    1.4   Water treatment process
    1.5   Effect of water quality on processed foods

2. **CARBOHYDRATES**   **12 hours**

    2.1   Classification
    2.2   Chemical structure
    2.3   Physical and chemical properties
    2.4   Effect of processing

3. **LIPIDS**   **12 hours**

    3.1   Classification
    3.2   Physical properties
    3.3   Chemical properties
    3.4   Functional properties in foods
    3.5   Effect of processing

4. **PROTEINS**   **10 hours**

    4.1   Classification
    4.2   Physical and chemical properties
    4.3   Functional properties in foods
    4.4   Effect of processing

5. **VITAMINS**   **6 hours**
    5.1   Classification
    5.2   Functional properties in foods
    5.3   Effect of processing

6. **OTHER CONSTITUENTS**   **12 hours**
    6.1   Mineral elements

     6.2   Pigments
     6.3   Aromatic compounds
     6.4   Antinutritional compounds

7.   SAMPLING TECHNIQUES   **12 hours**
     7.1   Food analysis
     7.2   Perfect and composite sample
     7.3   Sampling procedure
     7.4   Sampling instruments
     7.5   Sample grinding
     7.6   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.   INSTRUMENTAL TECHNIQUES   **12 hours**
     9.1   Introduction
     9.2   Principles and types of chromatography
     9.3   pH
     9.4   Polarimetry
     9.5   Refraction of light
     9.6   Flame-photometry

RECOMMENDED BOOKS

1.   Meyer, Food Chemistry, AVI, Westport
2.   F.A. Lee, Food Chemistry, AVI, Westport
3.   J.A. Awan, Elements of Food and Nutrition, Virgos, 6-Moon Plaza, Chiniot Bazaar, Faisalabad

FT 203   **FOOD CHEMISTRY & ANALYSIS**

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   Describe the physical properties
   1.3   Describe the chemical properties
   1.4   Explain the nature of hard and soft waters
   1.5   Explain the role of hard and soft waters
   1.6   Describe the methods of water treatment
   1.7   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
   2.2   Explain various physical properties
   2.3   Discuss the chemical structure
   2.4   Explain various chemical properties
   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   Explain the classifications
   3.2   Describe the physical properties
   3.3   Describe chemical properties
   3.4   Explain the functional properties
   3.5   Explain the effect of processing
   3.6   Explain deteriorative changes

4.   UNDERSTAND THE NATURE AND PROPERTIES OF PROTEINS

   4.1   Explain classification
   4.2   Discuss physical properties
   4.3   Discuss chemical properties
   4.4   Explain Maillard reaction
   4.5   Discuss functional properties of various proteinsespecially gluten, casein, and albumin
   4.6   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 CONSTITUENTS

   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

7.   UNDERSTAND SAMPLING TECHNIQUES
1.1   Illustrate the significance of food analysis in food industry
1.2   Define quantitative and qualitative analysis
1.3   Define perfect and composite sample
1.4   Explain sampling procedure
1.5   Enlist sampling instruments
1.6   Explain procedure for sample grinding
1.7   Describe procedure for sample storage

8.   KNOW THE PROXIMATE ANALYSIS
2.1   Define proximate analysis
2.2   State methods of analysis for moisture
2.3   State methods of analysis for crude fat
2.4   State methods of analysis for ash
2.5   State methods of analysis for crude fiber,
2.6   State methods of analysis for nitrogen free extract

9.   UNDERSTAND INSTRUMENTAL TECHNIQUES
6.1   Illustrate the importance of instrumental techniques
6.2   State the principles of chromatography
6.3   Enlist types of chromatography
6.4   Describe HPLC, gas chromatography, TLC and paper chromatography
6.5   State principles and application of pH meter
6.6   Define polarized light,
6.7   Discuss principles and application of polarimeter
6.8   Define refractive index
6.9   Explain the working of refractometer
6.10   Explain principles of flame photometry
6.11   Describe instrumental methods for texture measurement
6.12   Define viscosity
6.13   Discuss measurement of viscosity

FT 203   **FOOD CHEMISTRY & ANALYSIS**

LIST OF PRACTICALS

1. Visit to a water treatment plant
2. Water hardness test
3. Preparation of invert sugar by acid hydrolysis
4. Demonstration of heat denaturation of various proteins
5. Physical properties of lipids
6. Chemical properties of lipids
7. Effect of baking on browning and flavor
8. Determination of moisture by different methods
9. Determination of ash and mineral matter
10. Determination of insoluble solids (fiber)
11. Determination of reducing sugars
12. Determination of total sugars
13. Qualitative analysis of food colours using paper chromatography
14. Determination of acidity and pH
15. Determination of coloring agents
16. Determination of benzoic acid
17. Determination of nitrite and nitrate
18. Determination of sodium, potassium and calcium by flame photometry
19. Determination of vitamin C

FT 223   **FRUITS, VEGETABLES AND BEVERAGES 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 fruits and vegetables processing industry

1   INTRODUCTION   **10 hours**

1.1   Harvesting, and preprocessing
1.2   Processable fruits and vegetable
1.3   Chemical composition of fruits and vegetables
1.4   Nutritional value of fruits and vegetables

2.   DETERIORATION FACTORS AND THEIR CONTROL   **8 hours**

2.1   Enzymatic changes
2.2   Chemical changes
2.3   Physical changes
2.4   Biological changes

3.   FRUIT AND VEGETABLE PRESERVATION   **14 hours**

3.1   Fresh storageof fruits & vegetables
3.2   Chemical Preservationof fruits & vegetables
3.3   Drying/Dehydrationof fruits & vegetables
3.4   Heat Processingof fruits & vegetables
3.5   Freezingof fruits & vegetables
3.6   Fermentationof fruits & vegetables

4.   PRODUCTS   **16 hours**

4.1   Fried products
4.2   Dried products.
4.3   Preserves
4.4   Jam, Jelly & marmalade
4.5   Pickles
4.6   Chutneys
4.7   Pastes and Purees
4.8   By-Products

4.   Beverages   16 hours

   4.1   Definition
   4.2   Classification
   4.3   Alcoholic & Non-Alcoholic Beverages
   4.4   Fruit Beverages
   4.5   Carbonated beverages
   4.6   Soups
   4.7   Tea

Recommended Books

1. Fruit and vegetable processing
   By mirceaenachescudauthy
   Fao agricultural services bulletin no.119

2. Fruit and Vegetable Preservation: principle & Practice
   RP. Srivastava, Sanjeev Kumar

3. Carbonated Soft Drinks: Formulation and Manufacture
   Edited by Dr. David Steen, Dr. Philip R. Ashurst
   Blackwell publishing ltd.

FT 223   FRUITS, VEGETABLES AND BEVERAGES TECHNOLOGY

INSTRUCTIONAL OBJECTIVES

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

1   INTRODUCTION
    1.1   Enlist factors considered important for picking of fruits & vegetables.
    1.2   Enlist factors considered important in harvesting of fruits & vegetables.
    1.3   Enlist major causes of deterioration in fruits & vegetable after harvesting.
    1.4   State preprocessing steps after harvesting.
    1.5   Describe Temporary storage before processing
    1.6   Explain the factors affecting the suitability of fruits and vegetables for processing.
    1.7   Define fruit?
    1.8   Define climacteric and non-climacteric fruits
    1.9   Enlist climacteric and non-climacteric fruits
    1.10   Define vegetable?
    1.11   Describe the classification of vegetables.
    1.12   Describe composition of fruits & vegetables.
    1.13   Describe nutritional value of fruits & vegetables.

2.   DETERIORATION FACTORS AND THEIR CONTROL

    2.1   Describe kind of enzymatic changes in fruits and vegetables
    2.2   Enlist major factors useful in controlling enzyme activity.
    2.3   Describe major chemical changes occurring during the processing and storage.
    2.4   Describe physical changes
    2.5   Describe microbiological aspect
    2.6   Describe macro biological (insects, pests & rodents) aspect

3.   GENERAL PROCEDURES FOR FRUIT AND VEGETABLE PRESERVATION

    3.1   Describe fresh storage of fruits & vegetables
    3.2   Describeuse of food additives in fruit and vegetable products
    3.3   Define drying.
    3.4   Define dehydration.
    3.5   Describe process of dehydration for fruits and vegetables.
    3.6   Describe reconstitution for dried / dehydrated products.
    3.7   Define pasteurization
    3.8   Define sterilization
    3.9   Define commercial sterilization
    3.10   Define canning
    3.11   Describe in steps the process of canning of fruits & vegetables.
    3.12   Describe the preparation of fruits & vegetables for freezing.
    3.13   Describe methods of freezing

3.14   Define fermentation
3.15   Describe classification of fermentation.
3.16   Describe the use of fermentation in fruits and vegetable preservation.

4.   PRODUCTS

4.1   Describe the process for fried products
4.2   Describe the process for dried products.
4.3   Describe the process for preserves
4.4   Describe the process for jam, jelly & marmalade.
4.5   Describe the process for pickles
4.6   Describe the process for chutneys
4.7   Describe the process for pastes and purees.
4.8   Describe by-products from fruits & vegetable industries.

5.   Beverages

4.1   Define beverage
4.2   Describe Classification of beverages.
4.3   What are Alcoholic & Non-Alcoholic Beverages
4.4   What are Fruit Beverages
4.5   Define RTS (Ready-to-Serve)
4.6   Define squash.
4.7   Define Nectar
4.8   Define Cordial
4.9   Define Syrup
4.10   Enlist ingredients used in carbonated beverages
4.11   Describe the manufacturing process of carbonated beverages
4.12   Describe the process for soups
4.13   Describe processing of tea

FT 223   FRUITS, VEGETABLES AND BEVERAGES TECHNOLOGY

LIST OF PRACTICALS

1. Visit to a green market
2. Physical examination of fruits and vegetables.
3. Visit to a food storage facility
4. Preparation of brine and syrup
5. Determination of Brix by refractometer and Saccharometer.
6. Determination of Salt concentration by Salometer.
7. Use of washing, sorting, peeling and blanching equipments
8. Use of cutting, dicing, slicing equipments
9. Canning of available fruits/vegetables
10. Drying / dehydration of available fruits/vegetables
11. Freezing of available fruits/vegetables
12. Prepare fried product from available fruits/vegetables
13. Prepare jam from available fruits/vegetables
14. Prepare jelly from available fruits/vegetables
15. Prepare fried product from available fruits/vegetables
16. Prepare marmalade from orange
17. Visit to a food processing unit
18. Preparation of pectin jelly
19. Preparation of fruit/vegetable juice
20. Preparation of squash
21. Preparation of syrup
22. Visit to a beverage plant
23. Prepare soup from available fruits / vegetables
24. Prepare pickle from available fruits/vegetables

FT 232   FATS AND OIL 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 Lipids, oils and fats, ghee and wax
      1.2 Importance
      1.3 Sources
      1.4 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**   **6 hours**

      3.1   Classification
      3.2   Characteristics of edibles oils, fats and fatty acids
      3.3   Physical and chemical properties

4. **SPOILAGE**   **4 hours**
      4.1   Oxidative Rancidity
      4.2   Hydrolytic Rancidity

4.3   Polymerization

5.   MANUFACTURING   **6 hours**
    5.1   Manufacture of vegetable ghee and oil
    5.2   Manufacture of margarine
    5.3   Processing 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.

FT 232   FATS AND OIL TECHNOLOGY

INSTRUCTIONAL OBJECTIVES

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

1.   UNDERSTAND THE BASICS OF OILS AND FATS

1.1   Classify oils and fats
1.2   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   Explain 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   Explain various machines used in extraction of oils
2.4   Discuss degumming, refining, bleaching, deodorization, fractionation, winterization, hydrogenation, interesterification, esterification and emulsification steps involved in processing of oil and fats
2.5   Describe refining of vegetable oils
2.6   Explain removal 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 properties of oils and fats
3.2   Discuss the chemical properties of oils and fats
3.3   Explain saturated and unsaturated fatty acids
3.4   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 in oils
4.5   Explain important chemical reactions taking place in food

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

FT 232   FATS AND OIL TECHNOLOGY

LIST OF PRACTICALS

1	Extraction of oil and fats by expeller method.
2	Extraction of oil and fats by rendering method.
3	Extraction of oil and fats by solvent extraction method.
4	Determination of refractive index
5	Measurement of color by colorimeter and spectrophotometer.
6	Determination of melting point of fats and oils
7	Determination of melting point of butter
8	Determination of specific gravity of different fats and oils
9	Determine the peroxide value of fats and oils
10	Determine the saponification value of fats and oils
11	Determine the iodine value of fats and oils
12	Visit to oil and fat industry
13	Preparation of mayonnaise
14	Study role of emulsifying agents
15	Preparation of salad oil
16	Determine the quality of frying oils

FT- 243 **MEAT, POULTRY AND FISH TECHNOLOGY**

Total Contact Hours

				T	P	C
Theory	64					
Practical	96			2	3	3

COURSE CONTENTS

1. MEAT PROCESSING   **22 hours**

    1.1   Types, composition
    1.2   Pre-mortem inspection of animals
    1.3   Slaughtering, cutting and dressing of animals
    1.4   Postmortem changes
    1.5   Grading of meat
    1.6   Meat preservation (Curing, canning, freezing & smoking)
    1.7   Meat spoilage and its control
    1.8   Cooked meat products
    1.9   Sausages
    1.10   Restructured meat
    1.11   By-products

2. Poultry   **18 hours**

    2.1   Classes of poultry meat
    2.2   Nutritive value of poultry meat
    2.3   Commercial Processing
    2.4   Storage of poultry meat
    2.5   Poultry Products
    2.6   Packaging
    2.7   By-products

3. EGGS   **10 hours**
    3.1   Composition
    3.2   Handling
    3.3   Grading
    3.4   Egg preservation methods
    3.5   Egg processing
    3.6   Functions of egg
    3.7   Packaging and storage

3. FISHAND SHELLFISH   **14 hours**

    3.1   Catching handling & storage
    3.2   Fresh water and Salt water fish
    3.3   Shellfish
    3.4   Nutrition
    3.5   Criteria for freshness
    3.6   Grading of fish
    3.7   Fish processing

3.8   Spoilage of fish
3.9   Fish preservation
3.10   By-products

RECOMMENDED BOOKS

1. Kerry, J., Kerry, J. and Ledward, D. 2007. Meat processing: improving quality. Woodhead Publishing Ltd., Abington, Cambrige, England.
2. Riaz, M.N. and Chaudry, M.M. 2003. Halal food production. CRC Press, Taylor & Francis Group, Boca Raton, Florida, USA.
3. Pearson, A.M. and Gillett, T.A. 1997. Processed meats. Chapman & Hall, Inc., New York.
4. Mead, G.C. 2004. Poultry meat processing and quality. Woodhead Publishing Ltd., Abington, Cambridge, UK.
5. Sim, J.S., Nakai, S. and Guenter, W. 2000. Egg nutrition and biotechnology. CABI Publishing, New York.
6. Pearson, A.M. and Gillett, T.A. 1996. Processed meats. Chapman & Hall, New York.
7. Long, A. 2008. Fish processing technology. Cyber Tech. Publications. New Delhi.
8. Ninawe, A.S. and Rathnakumar, K. 2008. Fish processing technology and product development. Narendra Publishing House, New Delhi.
9. Woodhead Publishing Ltd., Cambridge, UK.
10. Hall, G.M. 2001. Fish processing technology. Blackwell Pub Co, Cambridge, UK.

Result.pk

FT- 243   **MEAT, POULTRY AND FISH TECHNOLOGY**

INSTRUCTIONAL OBJECTIVES

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

1.   UNDERSTAND MEAT AND MEAT PROCESSING

1.1   Define meat, red meat & white meat
1.2   Give general composition of meat
1.3   Give the nutritional value of beef and mutton
1.4   Describe factors effecting the composition of meat
1.5   Describe grading of animals in live state.
1.6   Explain Halal slaughtering and dressing of meat carcass.
1.7   Explain postmortem changes in carcass
1.8   Explain the grading of meat
1.9   Describe preservation of meat
1.10   Describe curing, smoking, drying, canning and freezing of meat
1.11   Describe meat products (Minced, boneless, organ meat, meat balls, soups)
1.12   Describe meat cooking methods (Stewing, Roasting, Grilling, barbecuing etc.)
1.13   Describe preparation of sausages.
1.14   Describe the processing of restructured meat products
1.15   Enlist by-products from meat industry

2.   Poultry

2.1   Give composition and nutritional value of poultry meat
2.2   Describe classification of poultry meat
2.3   Describe poultry processing.
2.4   Describe portioning and deboning operations
2.5   Describe processing techniques for freezing and canning of poultry meat
2.6   Discuss control of spoilage in poultry meat
2.7   State chicken meat products.
2.8   Enlist by-products from poultry industry

3.   UNDERSTAND EGG PROCESSING

3.1   Give composition of eggs
3.2   Describe structure of egg
3.3   Explain nutritive value of eggs
3.4   State methods of egg handling
3.5   Explain grading of eggs
3.6   Describe preservation of eggs
3.7   Describe processing of eggs
3.8   Describe functional properties of eggs.
3.9   Describe packaging and storage of eggs

4.   UNDERSTAND FISH PROCESSING

4.1   Describe catching, handling and storage of fish
4.2   Define fresh water and salt water fish
4.3   Describe shellfish
4.4   Give the composition fish meat
4.5   State criteria for freshness
4.6   Explain preparatory operations in fish (Heading, filleting, scaling).
4.7   Describe spoilage in fish meat
4.8   Describe preservation of fish
4.9   Describe frying, barbecuing & other fish products.
4.10   Describe fish protein concentrate and fish oil.
4.11   Enlist by-products from fish industry

FT- 243　　　　　MEAT, POULTRY AND FISH TECHNOLOGY

LIST OF PRACTICALS

1　Identify different meat breeds

2　Testing freshness of meat

3　Identification of meat cuts.

4　Testing quality of meat

5　Preparation of sausages

6　Preservation of meat (Salting, smoking, drying, canning, &freezing)

7　Beef & mutton product preparation

8　Identification and preparation of poultry cuts.

9　Determination of freshness of poultry

10　Preservation of poultry meat

11　Preparation of poultry products.

12　Determination of freshness of eggs

13　Grading of eggs.

14　Preservation of eggs

15　Preparation of egg products.

16　Use of eggs as ingredient in foods.

17　Quality indicators in freshness of fish

18　Salting and freezing of fish.

19　Preparation of different fish cuts

20　Preparation of fish products.

21　Visit to abattoir and meat processing industry.

22　Visit to egg processing plant.

23　Visit to fish harbor site/ fish farm.

FT 262   **FOOD PLANT LAYOUT AND HYGIENE**

Total Contact Hours

Theory	32			
Practical	96			

	T	P	C
	1	3	2

Pre-requisite FT 113, 124

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

2.   **PLANT CLEANING**   **12 hours**
      2.1   Need for cleaning
      2.2   Dismantling cleaning
      2.3   Cleaning-in-Place (CIP)
      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. Ltd., Amsterdam.

FT 262   **FOOD PLANT LAYOUT 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   Explain the importance of microbiology in food plant sanitation
   1.10   Discuss applications for maintaining good hygiene

2.   UNDERSTAND 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   Enlist factors affecting the degree of cleaning
   2.6   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

FT 262 **FOOD PLANT LAYOUT 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

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FT 271   **FOOD PACKAGING**

Total Contact Hours

    Theory   32   T   P   C

    Practical   0   1   0   1

    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 TO FOOD PACKAGING   **8 hours**

        1.1   Historical Background
        1.2   Definitions(Packaging, Packing)
        1.3   Levels of Packaging
                (Primary, Secondary,Tertiary, Quaternary)
        1.4   Functions of Packaging(Containment, Protection, Convenience, Communication)
        1.5   Package Environments(Physical, Ambient, Human)

2.   PACKAGING MATERIALS   **8 hours**

        2.1   Plastics
        2.2   Paper
        2.3   Metals
        2.4   Glass
        2.5   Edible, Bio-based and Biodegradable Food Packaging Materials

3.   ASEPTIC PACKAGING OF FOODS   **8 hours**

        3.1   Definition
        3.2   Principles of Sterilization (HTST, UHT)
        3.3   Sterilization of packaging materials (Irradiation, Heat, Chemical Treatment)
        3.4   Aseptic packaging systems(Carton system, Bottle systems, Bag-in-Box system)
        3.5   Integrity Testing of Aseptic Packages

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

       4.1   Packaging of Microwavable Foods
       4.2   Active and Intelligent Packaging
       4.3   Modified Atmosphere Packaging
       4.4   Lamination and coating technology

Recommended Books
Food Packaging: Principles and Practice, Third Edition
By Gordon L. Robertson
CRC Press Taylor & Francis Group

A Handbook of Food Packaging
By Frank A. Paine, H.Y. Paine
Springer-Science+business, Media, B.V

Food Packaging Technology
Edited by Richard Coles, Derek McDowell, Mark J. Kirwan
Blackwell publishing ,CRC Press

FT 271   **FOOD PACKAGING**

INSTRUCTIONAL OBJECTIVES

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

1. INTRODUCTION TO FOOD PACKAGING
1.1 Describe Historical Background of packaging.
1.2 Define Packaging.
1.3 Define Packing.
1.4 Define different Levels of Packaging
1.5 Distinguish between different levels of Packaging.
1.6 Know the functions of different levels of packaging.
1.7 Enlist functions of Packaging
1.8 Describe different functions of packaging
1.9 Describe reasons of packaging foods.
1.10 Describe environments where in the packaging has to perform its functions.

2. PACKAGING MATERIALS

2.1 Define plastics
2.2 Enlist plastics important in food packaging.
2.3 Enlist different types of plastics
2.4 Describe properties of plastics
2.5 Describe properties of paper.
2.6 Enlist types of paper.
2.7 Name paper products (paper bag, folding cartons, corrugated and solid paperboard)
2.8 Describe properties of metals.
2.9 Describe container making process.
2.10 Describe aluminum foil
2.11 Describe protective coatings.
2.12 Enlist principle raw materials used in glass.
2.13 Describe making of glass
2.14 Enlist advantages of glass
2.15 Enlist disadvantages of glass
2.16 Enlist edible packaging materials
2.17 Enlist functions of edible packaging materials
2.18 Describe functions of edible packaging materials
2.19 Define bio based packaging materials
2.20 Enlist Bio based and Biodegradable Food Packaging Materials
2.21 Describe use of Bio based and Biodegradable

3. ASEPTIC PACKAGING OF FOODS
3.1 Define Aseptic packaging.
3.2 Enlist sterilization processes used in aseptic processing
3.3 Define HTST.
3.4 Define UHT.
3.5 Describe requirements of an aseptic filling system.
3.6 Describe aseptic packaging systems.
3.7 Describe sterilization of packaging material by irradiation.
3.8 Describe sterilization of packaging material by Heat.
3.9 Describe sterilization of packaging material by chemical treatments.

4. RECENT TRENDS IN PACKAGING

4.1   Enlist types of packaging materials used to package food in a microwave oven.
4.2   Describe the reaction of Packaging material to Microwaves.
4.3   Define active packaging.
4.4   Enlist active packaging systems and their application in food.
4.5   Define intelligent packaging.
4.6   Enlist classification of intelligent packaging systems.
4.7   Define Modified Atmosphere Packaging.
4.8   Enlist advantages and disadvantages of MAP (Modified Atmosphere Packaging).
4.9   Enlist gases used in MAP.
4.10   Enlist methods of creating MA conditions
4.11   Describe Lamination and coating technology

FT 282   **SUGAR & CONFECTIONERY TECHNOLOGY**

Total Contact Hours

    Theory 32   T   P   C

    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   Composition and nutritional value

2. REFINING AND SUGAR MANUFACTURING   **8hours**
    2.1   Juice extraction
    2.2   Purification
    2.3   Evaporation
    2.4   Crystallization
    2.5   Affination
    2.6   Clarification
    2.7   Carbonation
    2.8   Sulphitation
    2.9   Phosphitation
    2.10   Crystallization
    2.11   Centrifugation
    2.12   Drying
    2.13   Bagging&Storage
    2.14   Factors affecting sugar processing

3. INTRODUCTION TO CONFECTIONERY AND ITS INGREDIENTS 6 hours
    3.1   Ingredients
    3.2   Types of Ingredients
    3.3   Functions
    3.4   Scope and status of Confectionery Industry.

4. SUGAR CONFECTIONERY   **6 hour**
    4.1   Classifications
    4.2   Candies
    4.3   Toffees
    4.4   Lolly Pops
    4.5   Gums and Jellies
    4.6   Fudge and fondant
    4.7   Packaging
    4.8   Machinery and Equipment

5. CHOCOLATE CONFECTIONERY   **6 hours**
    5.1   Classification

5.2   Coca Processing
5.3   Couching
5.4   Enrobing
5.5   Molding
5.6   Caramel and Bars
5.7   Chocolate Coating Products
5.8   Quality control

6. TYPICAL / TRDITIONAL SWEETS   4 hours

6.1   Khoya& paneer based sweets
6.2   Halwajaat
6.3   Processing

BOOKS RECOMMENDED:

1. G.R.E.Lionnet, 1999.Sugar TechnologyforStudents.LangFred, Durban.
2. E.B. Jacjson, 1995.Sugar ConfectioneryManufacture. 2nded. Balckie AcademicandProfessionalWester, Glassgow.
3. C. Chen, 2001.TheSugar Refining–A Manualfor theDesign andRefiningFacilities, JohnWileyand Sons,London.
4. W.P.Edwards, 2000.The Science ofSugar Confectionery,Royal Societyof Chemistry, Cambridge 100

Result.pk

FT 282   SUGAR AND CONFECTIONERY TECHNOLOGY.

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

1. UNDERSTANDTHE FUNDAMENTALSOFSUGAR 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. Explain the chemical composition and nutritional value of all sugar sources

2. UNDERSTAND THE REFINING MANUFACTURING PROCESS OF SUGAR
    2.1 Define affination and its significance
    2.2 Define clarification and its role
    2.3 Define carbonation and its significance
    2.4 Define sulphitation, phosphitation.
    2.5 Explain process of crystallization
    2.6 Describe the importance of centrifugation
    2.7 Explain the role of drying
    2.8 Discuss the recent advances in sugar technology
    2.9 Discuss packaging and storage of sugar
    2.10 Discuss all the unit operations involved in sugar manufacturing

3. UNDERSTANDTHE INGREDIENTS USED IN CONFECTIONERY
    3.1 Enlist Ingredients used in Confectionery
    3.2 Describe the different Ingredients used in Confectionery.
    3.3 Discuss the role of different ingredients in confectionery.
    3.4 Describe the status and scope of confectionery industry in Pakistan.

4. SUGAR CONFECTIONERY
    4.1 Classify sugar confectionery
    4.2 Describe the classification of different types of candies.
    4.3 Describe the processing of milk based candies.
    4.4 Describe the processing of fruit flavored candies.
    4.5 Describe the different types of toffees.
    4.6 Describe the processing of milky toffee
    4.7 Describe the processing of fruit flavored and chewy toffees
    4.8 Elaborate the process of lollypop making.
    4.9 Describe the processing of bubble gum and chew gum.
    4.10 Explain the processing of jellies and marshmallow.
    4.11 Describe the process of fudge and fondant making.
    4.12 Describe the different types of packaging used in confectionery.

5. CHOCOLATE CONFECTIONERY
    5.1 Classification of chocolaty confectionery
    5.2 Describe Coca bean Processing.
    5.3 Describe the uses of cocoa powder and cocoa butter.
    5.4 Describe the importance of couching process in chocolate processing.
    5.5 Explain Enrobing process.
    5.6 Describe Molding process.
    5.6 Describe the processing of Caramel and Bars.
    5.7 Describe Chocolate Coating Products.
    5.8 Describe the packaging technology and materials used for chocolate confectionery.
    5.9 Describe the important quality factors of chocolate confectionery.

6. TRADITIONAL SWEETS

6.1 Describe the classification of Khoya& paneer based sweets.
6.2 Describe the processing of different traditional sweets barfi,rasgula,gulabjaman,and jalebi.
6.3 Describe the ingredients and preparation of different types of halwajaat like carrot halwa,egg-halwa, almond-halwa and walnut-halwa.

FT 282   SUGAR AND CONFECTIONERY TECHNOLOGY.

LIST OF PRACTICALS   96 hours

1. Chemical analysis of sugar cane juice.

2. Physical analysis of sugar cane juice.

3. Analysis of sugar for Total soluble solids.

4. Analysis of sugar for pH

5. Determination of sugar ash.

6. Clarification of raw juice

7. Determine the density of juice by using pycnometer

8. Determine the turbidity of juice by using Turbidity meter

9. Visit to sugar industry.

10. Preparation of different types candy

11. Preparation of different types of toffee and other sugar based confectionery

12. 10, Determine inversion of sugar

13. Determination of moisture of candies.

14. Determination of moisture of toffees.

15. Preparation of caramel and fudge.

16. Preparation of typical sweets like burfi,rusgula and gulabjaman etc.

17. Preparation of Halwajaat like carrot halwa, egg halwa ,almond and walnut halwa

18. Preparation of jelly.

19. Visit to a confectionery unit.

20. Visit to a sweets processing unit.

FT 291   **FOOD LAWS & STANDARDS**

Total Contact Hours

    Theory   32   T   P   C

    Practical   0   1   0   1

AIM: To acquaint the students with existing laws governing manufacture, distribution and sale of foods

COURSE CONTENTS

1.   *FOOD LEGISLATIVE SYSTEMS*   *08 hours*
    1.1   Concept and significance of food legislation
    1.2   Food Legislation in Pakistan
    1.3   Significance of international food laws
    1.4   Role of international agencies

2   *ENFORCEMENT OF FOOD LAWS*   *12hours*
    2.1   Importance of quality control department in the food industry.
    2.2   Current food legislation and standards in Pakistan
    2.3   Compliance to food laws enforcement agencies
    2.4   Food establishment Inspections

3.   *FACTORY LAWS AND RULES*   *12hours*
    1.1   Edicts and regulations of food factory laws.
    1.2   Codes of practice of factory laws
    1.3   Manpower factor
    1.4   Local building regulations
    1.5   Labour Department recommendations
    1.6   Public Health Acts and Edicts
    1.7   Patents
    1.8   Procedures involved in plant start ups and shutdowns.

RECOMMENDED BOOKS
    1. M.A. Josylin and J.E. Heid, Food Processing Operations, AVI, Westport
    2. Muther, Practical Plant Layout, McGraw-Hill Book Co.
    3. Food Laws Manual, I.M. Awan, Mansoor Book Depot, Lahore
    4. H.W. Schultz, Food Laws Handbook, AVI, Westport
    5. Iqbal Mahmood Awan, Food Laws Manual, Mansoor Book House, Lahore.
    6. J.E. Reid, Food Process Engineering, AVI, Westport.

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

1.   *UNDERSTAND THE CONCEPT OF FOOD LEGISLATION*
  1.1   Define food legislation and explain its importance
  1.2   Identify the scope of food legislation
  1.3   Explain the current food legislation system in Pakistan.
  1.4   Describe Islamic food laws
  1.5   Explain lawful and unlawful food ingredients.
  1.6   Explain the role of Punjab food authority.
  1.7   Describe role of Pakistan Standards and Quality Control Authority
  1.7   Explain the significance of slaughtering of animals in accordance with Islam
  1.8   Explain the food legislation system operating internationally
  1.9   Explain the role of FAO, WHO and Codex Alimentarius Commission in food legislations.

2.   *UNDERSTAND FOOD LEGISLATION FROM QUALITY CONTROL ASPECT*
  2.1   Explain current food regulations in the country in relation to soft   drink.
  2.2   Prepare a food label to conform to labelling regulations
  2.3   Define a food standard and give its role in food legislation
  2.4   List important information required on a label
  2.5   Explain current food regulation in the country in relation to milk   processing.
  2.6   Explain current food regulation in the country in relation to water   processing.
  2.7   Explain current food regulation in the country in relation to bakery products.
  2.8   State consequence of non-compliance to food regulations and   standards
  2.9   describe the current regulation in the country in relation to hygiene   and sanitation in food processing area.

3.   *UNDERSTAND FACTORY LAWS AND RULES*
  3.1   Explain the Edicts and regulations of factory laws
  3.2   Explain the codes of practice of factory laws
  3.3   Discuss manpower factor in relation to production
  3.4   Explain the local building regulations
  3.5   Describe Labour Department recommendations
  3.6   Explain Public Health Acts and Edicts
  3.7   Discuss sources of technical information to patents
  3.8   Explain the procedures involved in plant start-up and shut-down.

DAE Food Technology

اسلامیات / مطالعہ پاکستان

کی	پلاؤ	ٹی	GEN 31C	نصاب (سال سوم)
1	5	1		حصہ اوّل اسلامیات

کل دقتے: 30 گھنٹے
حصہ دوم مطالعہ پاکستان

موضوعات:

1- قرآن مجید

سورۃ فاتحہ ۔ آیۃ الکرسی ۔ سورۃ البقرۃ کی آخری آیات ازامن الرسول سے تا آخر اور سورۃ طلاق مع ترجمہ و تشریح

2- دس منتخب احادیث مع ترجمہ و تشریحاً

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

☆ الدین النصیحۃ

☆ المنشا مومن

☆ للمومن علی المومن ست خصال یعود اذا مرض و تشمیتہ اذا عطس و یجیبہ اذا دعا

☆ لیسلم علیہ اذا لقیہ و لیشمتہ اذا عطس و فصیحۃ لہ اذا غاب فینصح

☆ لا یحزن من حدثک

☆ لا یفصل الجنۃ قاطع

☆ ان اللہ حرم علیکم عقوق الامہات و اضاعتہ امال

☆ لیسر و لا تعسر و لا تنفرا

☆ ذاق طعم الایمان من مرضی باللہ و بالاسلام دیناً بمحمدنبیا

☆ 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 ۔ استقلال ۔ عفو و درگذر ۔ ایفائے عہد ۔ امانت ۔ 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: آیتہ الکرسی۔ سورۃ بقرۃ کی آخری آیات از امن الرسول سے اور سورۃ اخلاق کا ترجمہ و تشریح کرسکے

طالب علم درج ذیل کا مفہوم بیان کرسکے

☆ رب العالمین صرف اللہ تعالیٰ ہے

☆ اللہ رحم کرنے والا ہے

☆ قیامت کے دن بادشاہی اللہ کی ہوگی

☆ عبادت اور استعانت کا حقدار صرف اللہ ہے

طالب علم درج ذیل کا مفہوم بیان کرسکے

☆ اللہ پاک ہر عیب سے پاک ہے

☆ اللہ کے اسمائے حسنہ حق اور قوم ہیں

☆ تعلیم انبیاء پر ایمان لانا ضروری ہے

☆ رسولؐ ملا کہ کتب سماویہ پر ایمان لانا فرض ہے

☆ اطاعت حقیقی صرف اللہ کے لیے ہے

☆ اسلامی احکامات پر عمل کرنا انسانی بھلائی میں ہے

☆ کفر کو اللہ کی مدد کے بغیر شکست نہیں دی جاسکتی

☆ 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 کرسکے

☆ احادیث کی تشریح کر سکے

☆ معاشرتی اور انفرادی زندگی میں احادیث سے رہنمائی 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

☆ مسلمانوں کے حقوق بیان کر سکے

☆ اسلام میں حقوق و فرائض کی آگاہی 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 معفو 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

DAE Technology

GEN 311

نصاب (سال سوئم)

مطالعہ پاکستان

حصہ دوئم

موضوعات

☆ قیام پاکستان

☆ باونڈری کمیشن

☆ ریڈ کلف ایوارڈ

☆ تقسیم بنگال و کلکتہ

☆ تقسیم پنجاب

☆ مسئلہ مہاجرین

☆ ریاست کا الحاق

☆ ریاست جموں و کشمیر

☆ نہری پانی کا تنازعہ

☆ قرار داد مقاصد

☆ علماء کے بائیس نکات

☆ 1956-1962 اور 1973 کے دساتیر کی اسلامی دفعات

☆ پاکستان کا محل وقوع اور اس کی جغرافیائی اہمیت

☆ قدرتی وسائل (تیل۔ گیس۔ کوئلہ)

مطالعہ پاکستان (حصہ دوئم)

قیام پاکستان

تدریس مقاصد

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

☆ خصوصی مقصد :

☆ باؤنڈری کمیشن تشکیل اور اس کے فرائض بیان کرسکے

☆ ریڈ کلف اور اس کے ایوارڈ کے بارے میں بیان کرسکے

☆ بنگال اور کلکتہ کی تقسیم کی وجوہات بیان کرسکے

☆ پنجاب کی تقسیم کی تفصیل بیان کرسکے

☆ مہاجرین کی آمد سے جو مسائل پیدا ہوئے انہیں بیان کرسکے

☆ ریاستوں کے الحاق کے بارہ میں تفصیل بیان کرسکے

☆ ریاست جموں کشمیر کے بارے میں بیان کرسکے

☆ نہری پانی کے تنازعہ کو بیان کرسکے

☆ قرار داد مقاصد کی تفصیلات بیان کرسکے

☆ 22 علماء کے متفقہ اسلامی نکات بیان کرسکے

☆ قیام پاکستان کے بعد نفاذ اسلام کی کوششوں کو بیان کرسکے

☆ پاکستان کے محل وقوع اور اس کی جغرافیائی اہمیت بیان کرسکے

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

DAE Technology

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نصاب اخلاقیات

(غیر مسلم طلباء کے لئے)

سی	ٹی	ٹی		
1	0	1		سال سوئم

Gen 311

کل وقت: 20

موضوعات

☆ احساس ذمہ داری

☆ مثبت ذہن

☆ عدل و انصاف

☆ قومی خدمت کا جذبہ

☆ فکر 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)

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(غیر مسلم طلباء کے لئے)

نصاب اخلاقیات

سال سوئم

تدریس مقاصد

عمومی مقصد : ملکی ترقی کےلئے اعلی اوصاف کے ساتھ بہتر طور پر ملک و ملت کی خدمت کرسکے

خصوصی مقاصد : طالب علم اس قابل ہو گا کہ

☆ موضوعات کا مطلب بیان کرسکے

☆ عملی زندگی سے مثالوں کی نشاندہی کرسکے

☆ موضوعات کی اہمیت بیان کرسکے

☆ اپنی شخصیت اور معاشرے پر موضوعات کے مطابق اثرات پیدا کرنے کے طریقے بیان کرسکے

☆ مثبت ذہن کے ساتھ کام کرسکے

☆ عدل و انصاف سے ادارہ میں' دفتر میں بہتر ماحول پیدا کرسکے

☆ ماحول کو اخلاقی طور پر پاکیزہ بنائے

☆ کارکنوں کی بہتر طور پر دل جوئی کرسکے

☆ کارکردگی میں اضافہ کرسکے

☆ باہمی احترام کی برکات سے استفادہ کرسکے

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.

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	

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-SanaatAurInsaniRawabat, IlmiKitab
       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 COUNSELLING**.
 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.

FT 313   **HOSPITALITY MANAGEMENT**

Total Contact Hours

			T	P	C
Theory	64		2	3	3
Practical	96				

AIM:

COURSE CONTENTS

1. INTRODUCTION TO HOSPITALITY MANAGEMENT   **12 hours**

1.1 Define hospitality Industry, Hospitality management, Guestology,
1.2 Principles Of Hospitality Management
1.3 The Hospitality Service Strategy
1.4 The Hospitality Service Staff
1.5 The Hospitality Service System

2. Kitchen Management   **16 hours**

2.1 Definitions
2.2 Kitchen planning and layout
2.3 Kitchen equipment
2.4 Cutting Terms
2.5 Cooking Terms
2.6 Catering equipment
2.7 Preventing food contamination and cross contamination
2.8 Type of food borne illness
2.9 Foods at risk for botulism food poisoning

3. Food & Beverages Services   **14 hours**

3.1 Introduction of Food & Beverage Department
3.2 Basic Hygiene
3.3 Personal Hygiene
3.4 Food & Beverage Service Terminology
3.5 Effective Communication
3.6 Laying a table setup
3.7 Order taking for the Guests
3.8 Front office management

4. Hotel Marketing & Sales   **10 hours**

4.1 Introduction of marketing
4.2 Strategic Marketing planning
4.3 Consumer Marketing

5. Event Management   **12 hours**

5.1 Event, Event management, sustainable event
5.2 Main elements of event organization
5.3 Location: destination and venue
5.4 Catering
5.5 Communication and event material

Recommended Books

1. International Hospitality Management

   By Alan Clarke, Wei Chen

2. The SAGE Handbook of Hospitality Management

   edited by Roy C Wood, Bob Brother

3. Hotel Management and Operations

   By Michael J. O'Fallon, Denney G. Rutherford

4. On Food and Cooking: The Science and Lore of the Kitchen
   By Harold McGee

INSTRUCTIONAL OBJECTIVES

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

1-Understand the Hospitality Management
  1.1 Define hospitality, Hospitality industry. Hospitality management and guestology.
  1.2 Enlist principles of hospitality management.
  1.3 State hospitality service strategy.
  1.4 State hospitality service staff.
  1.5 Describe hospitality service system

2- Understand the Kitchen Management and the mechanism of contamination of food items

  2.1   Define Kitchen Management.
  2.2   Describe kitchen planning and layout.
  2.3   List different kitchen equipment.
  2.4   Define different terms of cutting.
  2.5   Define cooking.
  2.6   List types of cooking.
  2.7   State terms of cooking.
  2.8   Define catering.
  2.9   List the requirements for catering.
  2.10   State different catering equipment.
  2.11 Define contamination.
  2.12 List the sources of food contamination.
  2.13 State preventive measure to control cross contamination.
  2.14   Define food poisoning.
  2.15 State types of food borne illness.
  2.16 State causes symptoms and therapy of botulism.

3-Understand Food & Beverages preparation and Services

  3.1   Describe the role of food and beverages department in hotel industry.
  3.2   Define hygiene.
  3.3   State the importance of hygiene in food and beverages processing
  3.4   Describe the characteristics for personnel hygiene.
  3.5   Describe the food and beverages service terminology.
  3.6   State the different types of communication
  3.7   Describe the importance of effective communication
  3.8   Describe laying and table setup,
  3.9   State the method of order taking and serving.
  3.10 State front office management
  3.11 State the responsibilities of front office manager.
  3.12 State the importance of personnel hygiene in food and beverages processing.

4- Understand Hotel Marketing & Sales strategies

  4.1   Define hotel marketing
  4.2   State marketing strategies
  4.3   Illustrate consumer marketing requirements

4.4   Describe different marketing tools

5. Understand the different types of events and their Management

5.1   Define event, event management, and sustainable events.
5.2   State the importance of location, destination and venue for event.
5.3   State specific types of catering for event.
5.4   Define exhibition
5.5   List the services provided for event.
5.6   Illustrate the types of event.
5.7   Describe the requirements for event management.

List of practical

1   Visit to a hotel and restaurant

2   Setup a kitchen for hotel industry

3   Cutting of different fruits

4   Cutting of different vegetables

5   Preparation of fruit product

6   Preparation of vegetables products

7   Cooking of vegetables and meats

8   Setup of catering equipment

9   Identification of sources that can contaminate

10   Preparation of different types of beverages and their serving.

11   Preparation of meal and its serving,/presentation

12   Draw layout of setup tables.

13   Study the product life cycle.

14 Setup of accommodation for an event.

15. Arrange and organize an event

16   Setup of different sitting styles.

FT 322   **NUTRITION AND DIETETICS**

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

Pre-requisite   FT-213

AIM: To Give the students knowledge of Food components and Nutrition in relation
                  to Food preservation

COURSE CONTENTS

1. **Introduction**   **6 hours**
    1.1 Food
    1.2 Nutrients
    1.3 Diet
    1.4 Malnutrition
    1.5 Balance Diet
    1.6 Metabolism
    1.7 Dietary reference value
    1.8 Reference Nutrient Intake (RNI)

2. **Functions of Foods**   **6 hours**
    2.1 Physiological functions
    2.2 Social functions
    2.3 Psychological functions

3. **Nutrients**   **12 hours**
    3.1 Macronutrients
    3.2 Micro-nutrients
    3.3 Protein
    3.4 Fat
    3.5 Carbohydrates
    3.6 Food Tests

    3.7 Vitamins
    3.8 Mineral Elements

4. **Digestion and absorption**   **8**
    4.1   Protein
    4.2   Carbohydrates
    4.3   Lipids
    4.4   Vitamins
    4.5   Minerals

5. **Nutritional and Health disorders**   **8**
    5.1   Nutritional disorders related to food shortages (Marasmus, kwashiorkor)

5.2   Health Disorder related to unwise food choice (Heart disease, obesity, eating disorder, tooth decay & gum diseases)

6. New Prospects in Nutrition   **8**
    6.1   Functional foods
    6.2   Dietary fibers
    6.3   Pro and prebiotics
    6.4   Phytochemicals
    6.5   Herbal and Botanical Supplements

7. Introduction To Dietetics   **8**
    7.1   Definitions Dietetics, Dietitian
    7.2   Role of Dietitian
    7.3   Difference between a Nutritionist and Dietitian
    7.4   Diet counseling

8. Food for different target groups   **8**
    8.1 Meal planning
    8.2 Dietary guidelines
    8.3 Diet for Diabetes
    8.4 Diet for cardio vascular disease
    8.5 Diet for kidney disease

Recommed books

1. Food and Nutrition
   By Anita Tull
   Oxford University Press

2. Fundamentals of Foods, Nutrition and Diet Therapy
   By Sumati R. Mudambi
   New age International

3. Nutrition & Dietetics 3E
   By Joshi
   Tata McGraw-Hill Education

FT 322   NUTRITION AND DIETETICS

INSTRUCTIONAL OBJECTIVES

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

1. Introduction
1.1   Define Food
1.2   Define Nutrition
1.3   Define Nutrients
1.4   Define Diet
1.5   Define Malnutrition
1.6   Define Under nutrition
1.7   Define Balance Diet
1.8   Define Metabolism
1.9   Define Dietary reference value

2. Functions of Foods
2.1   Describe Physiological functions of foods.
2.2   Describe Social functions of foods
2.3   Describe Psychological functions of foods

3.   Nutrients
3.1   Enlist Macronutrients
3.2   Enlist Micro-nutrients
3.3   Describe functions of Protein
3.4   Enlists sources of Protein
3.5   Describe functions of Fat
3.6   Enlists sources of Fat
3.7   Describe functions of Carbohydrates
3.8   Enlists sources of Carbohydrates
3.9   Describe classification of carbohydrates
3.10   Define vitamins
3.11   Describe classification of vitamins
3.12   Describe Functions of fat soluble vitamins.
3.13   Describe Functions of water soluble vitamins.
3.14   Describe Functions of minerals.

4.   Digestion and absorption

4.1   Define digestion of food.
4.2   Describe digestion and absorption of Protein.
4.3   Describe digestion and absorption carbohydrates
4.4   Describe digestion and absorption lipids
4.5   Describe digestion and absorption vitamins
4.6   Describe digestion and absorption minerals

5.   Nutritional and Health disorders
5.1   Describe Nutritional disorders related to food shortages
5.2   What are Marasmus and kwashiorkor?

5.3   Describe Health Disorder related to unwise food choice
5.4   Describe Heart disease, obesity, eating disorder, tooth decay & gum diseases

6.   New Prospects In Nutrition
6.1   Describe Functional/nutraceutical foods.
6.2   Describe Dietary fibers.
6.3   Describe pro and prebiotics
6.4   Describe Phytochemicals.
6.5   Describe Herbal and Botanical Supplements

7.   Introduction To Dietetics
7.1   Define Dietetics
7.2   Define Dietitian
7.3   Describe Role of Dietitian
7.4   Describe Difference between a Nutritionist and Dietitian
7.5   What is Diet Counseling?

8.   Food for different target groups
8.1   Describe Meal planning
8.2   Describe Dietary guidelines
8.3   State Diet for Diabetes
8.4   Describe Diet for cardio vascular diseases
8.5   Describe Diet for kidney diseases

FT -303   CEREAL AND BAKING TECHNOLOGY

Total Contact Hours

Theory	64	T	P	C
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   **6 hours**
   1.1   Importance and production of cereal grains.
   1.2   Structure and composition of wheat grain.
   1.3   Structure and composition of rice grain.
   1.4   Structure and composition of maize grain.
   1.5   Grading of grains in Pakistan.

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.   RICE MILLING   **8 hours**

   4.1 Millingprocess.
   4.2 Parboiling of rice

            4.3 Steaming of rice
            4.4 Rice byproducts

5.   MAIZE PROCESSING   8 hours
            5.1 Production of corn flour
            5.2 Production of starch.
            5.3 Modified starches
            5.4 Production of oil.
            5.5 Production of gluten.

6.   DOUGH PRODUCTS   8 hours
      6.1 Types and formulations of bread.
      6.2 Ingredients.
      6.3 Bread making processes.
      6.4 Pizza
      6.5 Pita bread (Shawerma bread)
      6.6 Buns & rolls

7.   OTHER BAKED PRODUCTS TECHNOLOGIES   10 hours
            7.1 Biscuits, cookies and crackers.
            7.2 Cake & Pastry
            7.3 Wafers.
            7.4 Miscellaneous products.
            7.5 Flat bread technology.
            7.6 Pasta.
            7.7 Noodles and other extrusion products.

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.

FT 303   CEREAL AND BAKING TECHNOLOGY

INSTRUCTIONAL OBJECTIVES

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

1.   **DESCRIBE THE FUNDAMENTALS OF CEREALS**

    1.1   Explain structure and composition of wheat grain

    1.2 Describe structure and composition of rice grain

    1.3 Explain structure and composition of maize grain.

    1.4 Describe grading of cereal grains in Pakistan.

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 Describe 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 PAR BOILING AND MILLING OF RICE**

    4.1 Describe parboiling process in rice milling

    4.2 Describe milling of rice.

    4.3 Explain steaming process in rice milling

    4.4 List byproducts from rice industry

5.   **DESCRIBE PRODUCTS OF MAIZE PROCESSING.**

    5.1 Describe production of corn flour.

    5.2   Explain production of starch from maize

    5.3 Describe modified starches

    5.4 Describe extraction of oil from maize germ.

    5.5 Describe production of gluten from maize.

6.   **DESCRIBE TYPE, FORMULATION AND BREAD MANUFACTURING PROCESS.**

6.1 Enlist types of bread and describe their formulation/recipe.

6.2 Explain ingredients of bread and their functions.

6.3 Describe bread processing

6.4 Describe different types of pizza

6.5 Describe preparation of Shawerma bread

6.6 Describe technology involved in preparation of buns and rolls.

7.   **EXPLAIN TECHNOLOGY OF BAKED PRODUCTS, PASTA, NOODLES AND EXTRUSION PRODUCTS.**

7.1 Describe technology of biscuits, cookies and crackers.

7.2 Define and explain cakes, pastry and wafers.

7.3 Describe the technology involved in preparation of pasta and noodles products.

7.4 Explain flat bread technology.

FT 303   **CEREAL AND BAKING TECHNOLOGY**

LIST OF PRACTICALS   **96 Hours**

1 Determination of moisture, fat, fiber and nitrogen in cereals.

2 Visit to a flour mill.

3 Visit to modern rice mill.

4 Manufacture of leavened bread.

5 Baking of biscuits.

6 Determination of wet and dry gluten.

7 Manufacture of a drum dried cereal.

8 Preparation of composite flour.

9 Visit to a baking industry.

10 Determination of test weight and kernel hardness.

11 Preparation and sensory evaluation of cakes and cookies.

12 Preparation of Vermicelli.

13 Grading of Grains.

14 Flour Quality Assessment.

15 Determination of Moisture in Flour.

16 Determination of Protein in Flour.

17 Determination of Ash in Flour.

18 Measurement of Amylase Activity of Flour.

19 Rheological Characteristics of Dough.

20 Identification of rice varieties

21 Preparation of pizza

22 Preparation of pita bread

23 Preparation of cake

24 Preparation of pastry

25 Sensory evaluation of noodles and pasta

FT 343 **DAIRY 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   Production of milk in Pakistan
1.2   Dairy industry in Pakistan
1.3   Sources
1.4   Handling
1.5   Distribution
1.6   Composition
1.7   Properties of milk

2   MILK PROCESSING   **12 hours**

2.1   Method of procurement
2.2   Collection and Reception
2.3   Transportation
2.4   Unit operations in milk processing
2.5   Packaging

3.   MILK PRODUCTS TECHNOLOGY   **8 hours**
3.1   Flavored milk
3.2   Evaporated milk
3.3   Sweetened Condensed Milk
3.4   Powdered milk

4   CHEESE PROCESSING   **10 hours**
4.1   Classification of cheese
4.2   Composition and chemistry of cheese
4.3   Unit operations in processing of cheddar, cottage, soft and Roquefort cheese
4.4   Quality control in cheese making
4.5   Packaging

5.   CREAM AND ALLIED PRODUCTS PROCESSING   **10 hours**
5.1   Classification and chemical composition of various types of creams
5.2   Unit operations in processing of creams
5.3   Quality control to reduce spoilage
5.4   Packaging

6. **YOGURT** **8 hours**
    6.1   Chemistry and Microbiology of yogurt
    6.2   Production of plain, fruit, frozen and flavored yogurts
    6.3   Unit operations in processing of yogurt
    6.4   Quality Control in Yogurt Manufacturing
    6.5   Packaging

7. **BUTTER** **6 hours**
    7.1   Composition
    7.2   Processing of butter
    7.3   Unit operations in butter making
    7.4   Evaluation of keeping quality

8. **FROZEN MILK PRODUCTS AND ICE CREAM** **6 hours**
    8.1   Classification
    8.2   Composition
    8.3   Chemical nature
    8.4   Additives
    8.5   Processing of ice creams
    8.6   Unit operations in processing of ice cream
    8.7   Quality Control & Packaging.

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 Handbook. 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.

FT 343   DAIRY TECHNOLOGY

INSTRUCTIONAL OBJECTIVES

1.   INDTRODUCTION

    1.1   Describe Production of milk in Pakistan
    1.2   Describe Dairy industry in Pakistan
    1.3   Explain sources of milk.
    1.4   Describe handling and distribution of milk.
    1.5   Give Composition of milk
    1.6   Describe Properties of milk

2   MILK PROCESSING

    2.1   State milk procurement & explain method of procurement.
    2.2   Describe collection & reception of milk.
    2.3   Explain transportation of milk.
    2.4   Describe Unit operations in milk processing
    2.5   Describe Packaging of milk

3.   MILK PRODUCTS TECHNOLOGY

    3.1   Define Flavored milk
    3.2   Describe the procedure of flavored milk.
    3.3   Define Evaporated milk
    3.4   Describe the procedure of evaporated milk
    3.5   Define sweetened condensed milk
    3.5   Define Milk Powder &Explain its types

4   CHEESE PROCESSING

    4.1   Define Cheese &Describe Classification of cheese
    4.2   Give Composition and chemistry of cheese
    4.3   Describe Unit operations in processing of cheddar, cottage, soft and Roquefort cheese
    4.4   State Quality control in cheese making
    4.5   Describe Packaging of cheese

5.   CREAM AND ALLIED PRODUCTS PROCESSING

    5.1   Define Cream &Describe Classification and chemical composition of various types of creams
    5.2   Describe Unit operations in processing of creams
    5.3   State the role of Quality control to reduce spoilage
    5.4   Describe Packaging of cream and allied products

6.   YOGHURT

    6.1   Define Yoghurt &Describe Chemistry of yoghurt
    6.2   State Microbiology of yoghurt
    6.3   Enlist types of yoghurt
    6.4   Describe the Production of plain, fruit, frozen and flavored yoghurts

6.5 Describe Unit operations involved in processing of yoghurt
6.6 State Quality Control in Yoghurt Manufacturing
6.7 Describe Packaging of yoghurt

7. BUTTER
7.1 Define Butter &Give Composition of butter
7.2 Describe Processing of butter
7.3 Describe Unit operations in butter making
7.4 Explain the role of quality control to keeping quality.

8. FROZEN MILK PRODUCTS AND ICE CREAM
8.1 Describe the Classification of frozen milk products
8.2 Give Composition of frozen milk products
8.3 Describe Chemical nature of frozen milk products
8.4 Describe Additives used in manufacturing ice cream
8.5 Describe Processing of frozen milk products
8.6 Define Ice Cream
8.7 Describe Unit operations involved in processing of ice cream
8.8 State Quality Control in ice cream making
8.9 Describe Packaging of ice cream

FT 343   **DAIRY TECHNOLOGY**

LIST OF PRACTICALS   **96 hours**

1. Visit to a dairy farm

2. Visit to a milk processing plant

3. Fat and solids not fat determination in milk

4. Determination of pH, Specific gravity, acidity of raw and processed milk

5. Resazurine 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. Phosphate test

12. Microbiology of milk

13. Microbiology of milk products

14. Preparation of flavored milk

15. Adulteration tests of raw milk.

16. Sensory evaluation of raw milk, yoghurt, cheese and butter

17. Determination of cheese faults and grading methods

18. Preparation of ice cream

FT 353   FOOD ENGINEERING

Total Contact Hours

			T	P	C
Theory	64				
Practical	96		2	3	3

Pre-requisite

AIM: The course is aimed at making students proficient in basic engineering involved in food processing.

COURSE CONTENTS

1.   FOOD ENGINEERING   *4 hours*

1.1 Concept of unit operations in the food industry
1.2 Basic laws of energy and material balance
1.3 Generalized flow diagram of a food processing operation

2.   FLUIDS   *10 hours*

2.1 Definition and types
2.2 Mechanism of fluid flow
2.3 Fluid statics, fluid dynamics
2.4 Reynold's number
2.5 Viscosity, Units of viscosity
2.6 Newton's law of viscosity
2.7 Bernoull's theorem
2.8 Fluid heads, friction losses
2.9 Friction in pipes, enlargement and contraction losses

3.   MEASUREMENT OF VARIABLES OF FLOWING FLUIDS   *6 hours*

3.1 Types of manometers
3.2 Venturi-meter, orifice meter
3.3 Rota-meters,

4.   PUMPS   *12 hours*

4.1 Introduction
4.1 Types of pumps
4.3 Theory of compression,
4.4 Construction and working of compressors
 4.5 compressor selection

5.   HEAT TRANSFER   *14 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   *10 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 Principle, 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.   Walter. L. Bedger and Julius. T. Bencharo, Introduction to Chemical Engineering

2.   R.T. Toledo, Fundamentals of Food Process Engineering, AVI, Westport

3.   R.L. Earle, Unit Operations in Food Processing, Pergamon Press, Oxford.

FT 353   **FOOD ENGINEERING**

INSTRUCTIONAL OBJECTIVES

On completion of this course, the students will do:-
1.   UNDERSTAND UNIT OPERATIONS IN FOOD ENGINEERING
   1.1 Define food engineering
   1.2 Define unit operations, unit process, Give examples of unit operations.
   1.3 Define flow diagram
   1.4 Give examples of unit processes using flow diagrams
   1.5 Explain Laws of material and energy balance

2.   UNDERSTAND FLUIDS
   2.1 Define fluid
   2.2 Describe types of fluids
   2.3 Define fluid statics
   2.4 Develop relationship to calculate the pressure exerted by liquid column
   2.5 Define fluid dynamics
   2.6 Explain the mechanism of fluid flow by Reynold's experiment
   2.7 Differentiate between laminar flow and turbulent flow
   2.8 Explain critical velocity of flowing fluids
   2.9 Define point velocity, maximum velocity and mean velocity of flowing fluids
   2.10 Define viscosity and its units
   2.11 Give types of fluids on the basis of presence of viscosity.
   2.12 Differentiate between Newtonian and Non-Newtonian fluids
   2.13 Describe Bernoulli's Theorem and develop its mathematical equation
   2.14 Define fluid heads
   2.15 Describe head loss due to friction, enlargement and contraction

3.   UNDERSTAND THE MEASUREMENT OF FLUIDS
   3.1   Define measurement of fluids and enlist equipment
   3.2   Define and 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 and installation of Orifice meter, Venturi meter and Rota meter

4. UNDERSTAND THE WORKING OF PUMPS
   4.1   Define pump
   4.2   Enlist types of pumps
   4.3   Describe the working of centrifugal, positive displacement, reciprocating, plunger, diaphragm, gear, cycloidal and turbine pumps
   4.4   Explain the terminology used in pumps
   4.5   Explain suction and discharge heads
   4.6   Enlist factors considered in the selection of a pump
   4.7   Enlist pump losses
   4.8   Define compressors
   4.9   Explain working principle of reciprocation and centrifugal compressors
   4.10 Enlist factors considered for the selection of a compressor

5.   *HEAT TRANSFER*
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

5.   UNDERSTAND THE TRANSFER OF HEAT
5.1   Define heat and enlist modes of heat transfer
5.2   Explain conduction, convection and radiation
5.3   Define thermal conductivity
5.4   State Fourier's Law and gives its mathematical form
5.5   Give units of thermal conductivity
5.6   Describe the effect of temperature on thermal conductivity
5.7   State Newton's Law of heat convection
5.8   Enlist factors affecting overall heat transfer coefficient
5.9   Describe flow patterns in heat exchangers.
5.10   State Stefen Boltzmann's Law of heat radiation
5.11   Explain black body and grey body
5.12   Define and classify heat exchangers
5.13   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   Explain 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   UNDERSTAND 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

FT 353   **FOOD ENGINEERING**

LIST OF PRACTICALS
1.   Draw flow diagrams of some food processing operation
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 evaporator for juice
12.   Operation of evaporator for milk
13.   Operation of drum drier for milk
14.   Operation of drum drier for cereals

Result.pk

FT 363   **Food Safety & Quality Assurance**

Total Contact Hours

Theory   64   T   P   C
Practical   96   2   3   3

AIM: At the end of the course the students will be able to understand the food safety and quality assurance.

COURSE CONTENTS

1.   INTRODUCTION   **6 hours**
  1.2   Concept of Food Safety and Quality Assurance
  1.3   Scope, significance
  1.4   Safety, Health & Environment (SHE)
  1.5   Quality attributes

2.   FOOD SAFETY HAZARDS   **8 hours**

  2.1   Types of Food Hazards
  2.2   Non Biological Hazards
  2.3   Biological Hazards

3.   PROTECTING FOOD FROM CONTAMINATION   **8 hours**

  3.1   Contamination and its consequences
  3.2   Microbiological Contamination
  3.3   Chemical Contamination
  3.4   Physical Contamination
  3.5   Allergen Contamination

4.   FOOD SAFETY COMPLAINTS HANDLING   **8 hours**

  4.1   Types & routing of food borne diseases
  4.2   Managing food safety complaints
  4.3   Food Product Traceability
  4.4   Food Recalls
  4.5   Trainings of food handlers
  4.6   Food Defense and Bioterrorism

5.   QUALITY ASSURANCE/CONTROL OF OPERATION   8 hours

  5.1   Inspection of raw material
  5.2   Managing safe and hygienic premises
  5.3   Supplier ,transport and storage
  5.4   Cleaning and Disinfection
  5.5   Pest Control
  5.6   Personnel Hygiene
  5.7   Time and Temperature control/ (Food production management)
  5.8   Customer satisfaction

6.   HACCP (Hazard Analysis and Critical Control Point)   8 hours
  6.1   Introduction to HACCP
  6.2   Identification and Control of Hazards
  6.3   Pre-requisite of HACCP
  6.4   Preliminary steps of HACCP
  6.5   Hazard Analysis and Control Measures
  6.6   Critical Control Point and Critical Limits
  6.7   Monitoring and Corrective Actions
  6.8   Verification and Documentation

7.   QUALITY AND FOOD SAFETY MANAGEMENT SYSTEMS   8 hours
  7.1   Introduction to Quality and Food Safety Management Systems
  7.2   Quality Management System ISO 9001:2008
  7.3   Food Safety Management System ISO 22000
  7.4   Occupational Health and Safety ISO 18000
  7.5   Environment Management System ISO 14000
  7.6   British Retail Consortium BRC
  7.7   Good Lab Practices
  7.8   Halal food certification

8.   PREPARING FOR FOOD INSPECTIONS AND FOOD SAFETY AUDITS
        6 hours
  8.1   Concept of standard operating procedures.
  8.2   Concept of food safety audit checklists
  8.3   Role of auditor

BOOKS RECOMMENDED:

1. Vanderheijden. 1999. International Food safety hand book: Science, International Regulation and control Food Science & Technology).
2. FAO/WHO Assuring Food Safety and Quality: Guidelines for strengthening National Food Control System.
3. Clive de W. Blackburn and Peter J. M. Food Borne Pathogen Hazards, Risk Analysis and Control. Wood Head Publishing.
4. Ludwig T., Achim S., Martina P. and Gabriele J. 2007. Quality Management in Food Chains. Wageningen Academic Publishers The Netherland.
5. Sara E. M., Corol W. and Christos C. 2001. HACCP (Food industry briefing).
6. Food Import and Export Inspection & Certification System(Codex Alimentarius)

INSTRUCTIONAL OBJECTIVES

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

1.   INTRODUCTION
   1.1   Define Food Safety and Quality Assurance
   1.2   Describe Scope and significance of Food Safety and Quality Assurance
   1.3   Describe Safety, Health & Environment (SHE)
   1.4   Enlist Quality attributes
   1.5   Describe Quality attributes

2.   FOOD SAFETY HAZARDS

   2.1   Describe Types of Food Hazards
   2.2   Describe Non Biological Hazards
   2.3   Describe Biological Hazards

3   PROTECTING FOOD FROM CONTAMINATION

   3.1   State Contamination and its consequences
   3.2   Describe Microbiological Contamination
   3.3   Enlist Chemical Contaminants
   3.4   Describe Chemical Contamination
   3.5   Describe Physical Contamination
   3.6   State Allergen Contamination

4.   FOOD SAFETY COMPLAINTS HANDLING

   4.1   Describe Types of food borne diseases
   4.2   Name four types of microorganisms that can cause foodborne disease
   4.3   State Managing of food safety complaints
   4.4   What is Food Product Traceability
   4.5   Explain Food Recalls
   4.6   Describe Trainings of food handlers
   4.7   Describe food defense and bioterrorism

5.   QUALITY ASSURANCE/CONTROL OF OPERATION
   5.1   State Inspection of raw material
   5.2   Explain Managingof safe and hygienic premises
   5.3   Discuss the role of sanitation and cleaning during processing in food safety
   5.4   Know about Supplier ,transport and storage
   5.5   Define Cleaning and Disinfection
   5.6   Identify the correct order of sanitizing or cleaning a food contact surface
   5.7   Describe Pest Control

    5.8   Describe Personnel Hygiene

    5.9   Describe Food production management

    5.10 Enlist factors of Customer satisfaction

6   HACCP (Hazard Analysis and Critical Control Point)

    6.1   Introduction to HACCP

    6.2   Describe food related hazards

    6.3   Enlist high-risk foods and individuals

    6.4   Identification and Control of Hazards

    6.5   Enlist Pre-requisite of HACCP

    6.6   Describe Preliminary steps of HACCP

    6.7   Define Hazard Analysis and Control Measures

    6.8   Define Critical Control Point and Critical Limits

    6.9   Describe Monitoring and Corrective Actions

    6.10 Explain Verification and Documentation

7   QUALITY AND FOOD SAFETY MANAGEMENT SYSTEMS

    7.1   Introduction to Quality and Food Safety Management Systems

    7.2   Describe Quality Management System ISO 9001:2008

    7.3   Describe Food Safety Management System ISO 22000

    7.4   State Occupational Health and Safety ISO 18000

    7.5   Describe Environment Management System ISO 14000

    7.6   Describe British Retail Consortium BRC

    7.7   Define Good Lab Practices

    7.8   Describe Halal food certification

8   PREPARING FOR FOOD INSPECTIONS AND FOOD SAFETY AUDITS

    8.1   Describe standard operating procedures.

    8.2   State food safety audit checklists

    8.3   Describe Role of auditor

FT 363   FOOD SAFETY & QUALITY ASSURANCE

List of Practicals

1. Physical inspection of foods for spoilage and deterioration.
2. Swab testing of meat carcass, employee's hands, utensils, instruments and food preparation areas.
3. Practice of students to prepare food safety audit and inspection checklists and develop criteria to assess the food premises and food factory against this criteria.
4. Practice of students of wearing of hygiene caps, aprons, uniforms, shoe covers, gloves, goggles and follow instructions while working in food production areas.
5. Practice of students to follow standard practice of hands washing (step by step)
6. Microbiological analysis of water
7. Microbiological analysis of drinking milk
8. Visit of food industry quality control and quality assurance lab
9. Visit of college canteen against food safety checklist and write down the major and minor deviations.
10. Visit of food safety certified industry especially multinational company e.g beverage industry, Milk processing and other processing industries.
11. Identification of CCP in a food industry
12. Application of quality system in a proposed food industry
13. Preparation of flow diagrams of food processing unit
14. Sensory evaluation of food/Taste panel
15. Complaint handling/Traceability
16. Food product development

FT 383   **WASTE MANAGEMENT**

Total Contact Hours

		T	P	C
Theory	64			
Practical	96	2	3	3

Pre-requisite   FT 245

AIM: Give students knowledge of food industries waste and methods employed in its treatment, utilization and disposal

COURSE CONTENTS

1. INTRODUCTION   **5 hours**
1.1 Definitions of wastes and by-products
1.1.   Nature and classification of wastes.

2 SOLID WASTE MANAGEMENT   **11 hours**
2.1.   Characteristics
2.2 Separation
2.3 Recycling
2.4 Utilization

3. LIQUID WASTE MANAGEMENT   **10 hours**
3.1.   Characteristics
3.2 BOD, COD
3.3.   Toxic chemicals in effluents.

4. PHYSICAL METHODS OF LIQUID WASTE TREATMENT 12 hours
4.1 Sedimentation
4.2 Centrifugation
4.3 Concentration
4.4 Flotation
4.5 Adsorption
4.6 Ultra filtration

5. *CHEMICAL METHODS OF WASTE WATER TREATMENT*   ***12 hours***
5.1.   Coagulation
5.2.   Emulsion breaking

5.3 Neutralization
5.4.   Precipitation
5.5.   Chemical oxidation methods

6. *BIOLOGICAL METHODS OF WASTE WATER TREATMENT 6 hours*
6.1.   Aerobic process
6.2.   An-aerobic process

7. ENVIRONMENTAL POLLUTION   **8 hours**

    7.1 Definition
    7.2 Air pollution
    7.3 Noise pollution
    7.4 Land pollution
    7.5 Water pollution
    7.6 Role of Environmental Protection Agency

RECOMMENDED BOOKS

1.   J. H. Green and A. Kramer, Food Processing Waste Management, AVI, Westport.
2. A. Kramer and B.A. Twig, fundamentals of Quality Control for the Food Industries, AVI, Westport.

FT 383   **WASTE MANAGEMENT**

INSTRUCTIONAL OBJECTIVES

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

1.   *UNDERSTAND VARIOUS WASTES FROM FOOD INDUSTRY*
1.1 Define waste and by-product
1.2 Enlist types of wastes
1.3 Describe general classification of waste.
1.4 Classify food waste

2.   UNDERSTAND SOLID WASTE MANAGEMENT
2.1 Describe characteristics of solid wastes

2.2 Discuss utilization of wastes as food and feed through the production of biomass or single cell protein
2.3 Discuss uses of wastes as fuel through the production of biogas
2.4 Discuss uses of wastes as fertilizer
2.5 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 waster water.
3.5 Define and calculate B.O.D (biological oxygen demand) and C.O.D (chemical oxygen demand)
3.6 List possible chemical and biochemical toxic substances in effluents from food processing plants.

4.   UNDERSTAND THE PHYSICAL METHODS OF LIQUID WASTE TREATMENT
4.1 Explain the physical treatment by sedimentation,
4.2 Explain the physical treatment by, centrifugation
4.3 Explain the physical treatment by concentration
4.4 Explain the physical treatment by flotation,
4.5 Explain the physical treatment by, adsorption
4.6 Explain the physical treatment by ultra filtration,

5.   UNDERSTAND THE CHEMICAL METHODS OF WASTE WATER TREATMENT
5.1 Explain the chemical treatment by coagulation
5.1 Explain the chemical treatment by emulsion breaking
5.1 Explain the chemical treatment by neutralization
5.1 Explain the chemical treatment by precipitation
5.1 Explain the chemical treatment by chemical oxidation

6.   UNDERSTAND BIOLOGICAL METHODS OF WASTE WATER TREATMENT
6.1 Explain the biological treatment by activated sludge process,
6.2 Explain the biological treatment by trickling filter,

6.3 Explain the biological treatment by aerated lagoons

6.4 Explain the biological treatment by stabilization ponds

6.5 Explain the biological treatment by anaerobic process

7   UNDERSTAND ENVIRONMENTAL POLLUTION.

7.1 Define and identify sources of environmental pollution

7.2 Enlist different types of pollutants

7.3 Discuss possible chemical and biological toxic substances in air

7.4 Describe methods of air pollution prevention.

7.5 Enlist sources of noise pollution

7.6 Discuss effect of noise pollution on personnel

7.7 Describe control methods for noise pollution

7.8 Discuss the sources of land pollution

7.9 Discuss the effect of pollutants on eco system

7.8 List water pollutants

7.10 Discuss effect of water pollution on aquatic life

7.11 Explain the role of EPA in controlling the environmental pollution.

FT 383   **WASTE MANAGEMENT**

LIST OF PRACTICALS.

1. Utilization of wastes for preparation of animal feed

2. Utilization of wastes for the preparation of fertilizer

3. Determination of total solids in waste water

4. Determination of suspended solids in waste water

5. Determination of settleable solids in waste water

6. Determination of Dissolved oxygen

7. Determination of BOD

8. Calculation of COD

9. Visit to a bio gas plant

10. Visit to a food plant to see waste treatment plant

11. Visit to local municipal waste water facilities.

FT 391   **SPECIAL PROJECT**

Total Contact Hours
   Theory   0   T   P   C
   Practical   3   0   3   1

Pre-requisite Qualified first year of study

AIM: To familiarize the student with the concept of undertaking a study in the discipline and preparing a final written report

COURSE CONTENTS

1.   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.

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

1.   UNDERTAKE ASSIGNMENTS
Acquire the techniques of undertaking assignments in his discipline

3.   PRESENT REPORT
Present results of assignments in written as well as oral forms

Minimum Qualification of Teacher/ Instructor

- **M.Phil Food & Nutrition**

- **M.Sc. in Food Sciences.**

- **DAE in Food Technology OR DAE in Food Processing & preservation Technology, with 6-Years' relevant experience in teaching/ industry**

Employability of the pass-outs / Graduates

The pass-outs of this course can find job / employment opportunities in the following sector / areas ;

- <u>Dairy Industry:</u> (Nestle, Haleeb, Engro, Nirala, ete.)

- <u>Beverages:</u> (Pepsi Cola, Coca Cola, Amrat Cola, Shezan, Benz, Golden Juices, Maza, ete.)

- <u>Fats & Oils:</u>   (Habeeb, Kashmir, Dalda, Manpasad, Tuloo, etc.)

- <u>Confectionary:</u>   (Mitchell's, Mayfair, Candy-land, Hillal, etc)

- <u>Meat Industry:</u>   (K &Ns Foods, Floury Meat, Knoor, etc.)

- <u>Bread Industry:</u> (Vita, Dawn, Bunny, etc.)

- <u>Snack Industry:</u> (Lays, Golden, Triple EM, etc)