FACULTY OF SCIENCE

SYLLABI

FOR

PG Diploma in Chemical Analysis of Food

(Semester System)

EXAMINATIONS 2018-2019
PANJAB UNIVERSITY, CHANDIGARH

OUTLINES OF TESTS, SYLLABI AND COURSES OF READING FOR POSTGRADUATE DIPLOMA IN CHEMICAL ANALYSIS OF FOOD FOR THE EXMINATIONS OF 2018-2019

OBJECTIVE OF THE COURSE

To teach the fundamental concepts of Chemistry and their applications. The syllabus pertaining to Postgraduate Diploma in Chemical Analysis of Food in the subject of Chemistry has been upgraded as per provision of the UGC module and demand of the academic environment. The course contents have been revised from time to time as per suggestions of the teachers of the Chemistry working in the Panjab University, Chandigarh and affiliated colleges. The syllabus contents are duly arranged unit wise and contents are included in such a manner so that due importance is given to requisite intellectual and laboratory skills.

Outline of Tests

There will be two semesters in a year. Examination will be held at the end of each semester.

Total Marks: 300

There will be two theory papers and one practical paper in each semester.

1st Semester

<table>
<thead>
<tr>
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<th>M. Marks</th>
<th>Int. Ass.</th>
<th>Total Marks</th>
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<tbody>
<tr>
<td>Paper-I</td>
<td>Chemistry of Foods 40 Marks</td>
<td>10 Marks</td>
<td>50</td>
</tr>
<tr>
<td>Paper-II</td>
<td>Food Adulterants/ Additives and Testing Of Foods</td>
<td>40 Marks</td>
<td>10 Marks</td>
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</table>

Papers-III Practical 50

The Theory Examination will be of 3 hours duration. Annual Practical Examination will be of 4 hours.
Semester I

Paper I: Chemistry of Foods

Total marks: 50
Internal assessment: 10
Theory paper: 40
No. of lectures: 40
(4 Hrs./Week)
Time: 3 hours

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Unit-I

Foods: As source of Energy, energy value of foods, uses of foods in the body, digestion, absorption and transport. [10]

Unit-II

Chemistry of Fats and Oils: Composition-saturated and unsaturated fatty acids. Functions and storage in the body and Physio-chemical properties. An idea about soaps, detergents, emulsions and emulsifiers. [10]

Unit-III

Carbohydrates I: Composition and classification, storage in the body, biological functions of some monosaccharides and disaccharides (glucose, fructose, Sucrose, Maltose and lactose). [10]

Unit-IV

Carbohydrates II: Biological functions of some polysaccharides (starch and cellulose). Important chemical and biological reactions, Other sweetening agents: Saccharin, Aspartame. [10]
Instructions for Paper setters and Candidates:

1. Examiner will set a total of **NINE** questions. **TWO** questions from each unit and **ONE** compulsory question of short answer type covering the whole syllabi.

2. The students are required to attempt **FIVE** questions in all, **ONE** question from each unit and the Compulsory question.

3. All questions carry equal marks.

4. The Theory Examination shall be of 3 hours duration and practical examination shall of 4 hours

Recommended Books

2. Boyd, Morrison *Organic Chemistry*
4. Megar, Lillian Hoagland *Food Chemistry*

**Paper II: Food Adulterants/Additives and Testing of Foods**

Total marks: 50  
Internal assessment: 10  
Theory paper: 40  
No. of lectures: 40  
(4 Hrs./Week)  
Time: 3 hours

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**Unit-I**

**Food Adulterants I: Food Colours**
- Food colors and Additives.
- Kinds of colors used.
- Water soluble food colors.

**Unit-II**

**Food Adulterants II:** Dyes and preservatives

- Dyes: Permitted and non-permitted dyes.
- Identification of Dyes by Spot Test.
- Preservatives, Organic preservatives-Dyes-Percentage-Definition and classification.

**Unit-III**

**Milk and Milk Products:**
Composition, Classification, Processing, Natural Aspects of mild, curd, paneer, khoa, cheese, ice-cream and various kinds of processed milk.

**Unit-IV**

**Beverages:**
Tea, coffee, chocolate, cocoa powder, processing (in brief), chemical constituents, Good and Bad effects of alcoholic and non-alcoholic beverages.

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3. All questions carry equal marks.
4. The Theory Examination shall be of 3 hours duration and practical examination shall of 4 hours.

**Suggested Books/ Reading**

2. *Pearson Chemical Analysis of Food*
3. Jacob, Morria B *Chemical Analysis of Foods and Food Products*, 3rd Ed.
4. *Joslyn Methods in Food Analysis*
5. *Handbook of Analysis and Quality Control for fruit and vegetable products*

**Paper III: Practical**

1. Simple physical and chemical tests to determine quality and detect adulterants in the following:
(i) Milk and Milk products
(ii) Oils and fats
(iii) Spices and condiments
(iv) Food grains
(v) Flours
(vi) Canned Foods
(vii) Cane Sugar, Saccharin and Vegetable
(viii) Beverages Alcoholic, Non-Alcoholic

II. Principles and Techniques of separation methods, chromatography (TLC)

Suggested Books

1. Pearson *Chemical Analysis of Foods*
2. Jacob *Chemical Analysis of Food*, ISI Publications
4. Mahindra, S.N. *Food Additives*

Infrastructural Requirements

(a) Institutions/Colleges having a good laboratory for the conduct of Chemistry Practicals at the level of B.Sc. final year with quality apparatus, instruments and reagents.
(b) Additionally the institutions should have an easy to food analysis laboratories.
(c) Instrumentation facilities for practicals.
Semester II

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**Paper I: Chemistry of Foods**

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Theory paper: 40
No. of lectures: 40
(4 Hrs./Week)
Time: 3 hours

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**Unit-I**

**Amino Acids and Proteins:** Composition, sources, functions and deficiency symptoms, Physio-Chemical properties. Denaturation of proteins during processing, Chemical Analysis of proteins.

**Unit-II**

**Cereals and Pulses:** Brief introduction to cereals and pulses, composition and nutritional aspects.
Unit-III

Some Important Vitamins I: Fat soluble-Vitamins (A, D, E and K). Sources, structures and biological importance. [10]

Unit-IV

Some Important Vitamins II: Water soluble vitamin (Ascorbic Acid, thiamin, Riboflavin, B-Complex as B₆, Folic Acid). Sources, structures and biological importance. [10]

Instructions for Paper setters and Candidates:

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**Unit-I**

**Food Analysis I:** Sampling Technique, Preparation of Sample, General Physical methods of analysis of Foods (i) Bactometaric (ii) Refractometry (iii) Polarimetry and Polarography (iv) Chromatography (v) UV-Visible. [10]

**Unit-II**

**Food Analysis II:** General chemical Methods:
- Proximate Principle
- Specific Gravity method
- Ash and Types
- Total protein and Non-Protein N
- Total Fat and different kinds of Lipids
- Total carbohydrate, starch, mono/disaccharides. [10]

**Unit-III**

**Canned Foods:** Chemical composition and quality criterion of canned foods.

**Spices and Condiments:** Composition and Nature [10]

**Unit-IV**

**Legal Aspects of food Adulteration and Prevention**
- Standards of food quality.
- Permissible limits of food preservatives in, milk, spices, beverages and canned foods.
- Procuring and analysis of food items for confirming adulteration.
- Power and duties of Public Analyst and food Inspectors.
- Prevention of food adulteration. [10]

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Suggested Books/Reading
1. Prevention of Food Adulteration Act, 1988
2. Pearson Chemical Analysis of Food
3. Jacob, Morria B Chemical Analysis of Foods and Food Products, 3rd Ed.
4. Joslyn Methods in Food Analysis
5. Handbook of Analysis and Quality Control for fruit and vegetable products

Paper III: Practical 60 hrs.

I. Determination of Acid value, iodine Value and Saponification Value. (20)

II. (a) Visit to chemical/Food laboratories of Industry related to get students acquainted with various aspects of Chemical analysis of Foods.
   (b) To prepare and submit a report on the said visit (200-300 words).
   (c) Periodical Examination of students by asking viva-voce. (20)

III. Continuous assessment based on Regularity, House Tests and Attendance. (20)

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