FACULTY OF SCIENCES

SYLLABUS

FOR

Pre Ph.D. Course in FOOD TECHNOLOGY
(Credit Based Evaluation & Grading System)

Examinations: 2019-20

GURU NANAK DEV UNIVERSITY
AMRITSAR

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Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note: The course will be numerical oriented to train the students for the analysis of research data. Use of calculators will be allowed in the examination.

SECTION-A
1. Descriptive statistics: Statistical expressions, central tendency, dispersion of data (arithmetic and geometric), moments, skewness, kurtosis, sample size estimation.

SECTION-B
3. Testing of hypothesis: Central limit theorem, null hypothesis and alternative hypotheses, Z-test, Student’s t-test, $\chi^2$-square, F-test, sample size, confidence intervals. odds ratio, index numbers, Probit analysis.
4. Correlation and regression analysis: Linear correlation and regression, exponential regression, logarithmic regression, reciprocal regression, Michael-Menten’s regression, logistic regression, Gompertz regression, monomolecular regression.

SECTION-C
5. Multiple correlation and regression: MLR with 2 and 3 independent variables, quadratic and cubic polynomial regressions, Beta regression, sine curve, multiple correlation, partial correlation, path analysis, time series analysis.
6. Experimental designs: Experimental designs, central composite designs with 2 and 3 factors.

SECTION-D
7. Analysis of Variance: Assessing normality, one way and 2-way ANOVA, Tukey's multiple comparison test, HSD.
9. Non-parametric tests: Wilcoxon’s, Mann-Whitney’s tests, Spearman’s rank correlation, Kendall’s Tau.
10. Basic Greek and Latin words: The students will learn Greek alphabet and more than 100 basic roots and words used in science.

Note: The students will be asked to submit an assignment of computer softwares designed by them on the basis of the Research methodology syllabus.
References:


PRE PH.D. COURSE IN FOOD TECHNOLOGY (CBE & GS)

FTL-902: ADVANCED FOOD ANALYSIS

Credits: 3-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION-A
Applications of the following in the food analysis:


SECTION-B
Thermal methods in food analysis: Differential scanning colorimetry, Differential Thermal Analysis.
Chromatographic methods in Food Analysis: Column, Size exclusion and ion exchange.

SECTION-C
High Performance Liquid Chromatography, Gas Liquid Chromatography.
Visible and Ultraviolet Spectroscopy, FTIR Spectroscopy.
Flame Photometry and Atomic Absorption Spectroscopy.

SECTION-D
X-ray methods: Diffraction, Fluorescence.
Electrophoresis, Capillary Zone Electrophoresis.
Nuclear Magnetic Resonance.

Suggested Readings:
PRE PH.D. COURSE IN FOOD TECHNOLOGY (CBE & GS)

FTL-903: ADVANCES IN FOOD PROCESSING TECHNOLOGY

Credits: 3-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION-A

SECTION-B

SECTION-C

SECTION-D

Suggested Readings:
FTL-904: ADVANCED FRUITS AND VEGETABLES PROCESSING TECHNOLOGY

Credits: 3-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION-A

Present status of fruits and vegetables processing in India & world.
Prospects of future growth in fruits and vegetables processing in India.
Fresh Fruits & Vegetable Handling: Post-harvest physiology.

SECTION-B

Pre-packaging of fresh fruits and vegetables.
Modern techniques such as MAP, Ionizing Irradiation, growth hormones etc to enhance shelf life of fresh fruit and vegetable.


SECTION-C

Dehydration and freezing of fruits and vegetables.

Phyto-chemicals: Fruits and vegetables as a source of bioactive compounds.

SECTION-D


Cold chain: Importance of cold chain in food processing industry and retail chain.
Components of cold chain and integration.
Suggested Readings:


FTL-905: ADVANCED CEREAL SCIENCE AND TECHNOLOGY

Credits: 3-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION-A
Criteria of wheat and flour quality, structure and functional properties of gluten, wheat grain protein, starch, phytochemicals, dough chemistry, rheology, evaluation of flour quality by Farinograph, Mixograph, Extensogram, rapid visco analyzer, dynamic rheometry.

SECTION-B
Changes in physico-chemical, pasting and milling properties during aging of rice. Improving nutritional properties of rice by different methods. Manufacture of value added products such as zein from corn, processing of breakfast cereals from corn.

SECTION-C
Dietary fibre from barley and oats: β glucan structure, extraction, physiological effects and functional properties.
Additives used in bakery products.
Staling of bread, partially baked bread, frozen dough.
Gluten free bread: celiac disease, use of different cereal flours, enzymes and optional ingredients to improve gluten free bread quality.

SECTION-D
Raw materials for extrusion cooking, ingredients, classification of materials for snack foods and breakfast cereals, processing of flakes (wheat, rice, corn). Functions of extrusion technology, different types of extruders, applications, pros and cons.

Suggested Readings:
7. Watson SA & Ramstad PE. 1987. Corn; Chemistry and Technology. AACC.
FTP-906: SEMINAR
Credits: 0-0-1

Optional Subject from Other Department
Credits: 3-0-0