

DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY

TEACHING FACULTY

Professor

Narpinder Singh, Ph.D.(PAU)
Dalbir Singh Sogi, Ph.D.(GNDU)
Balmeet Singh Gill, Ph.D.(GNDU) (**Head**)
Hardeep Singh Gujral, Ph.D.(GNDU)
Navdeep Singh Sodhi, Ph.D.(GNDU)

Assistant Professor

Amritpal Kaur, Ph.D.(GNDU)
Maninder Kaur, Ph.D.(GNDU)
Bhavni Dhillon, Ph.D.(NDSU, USA)

Associate Professor

Raj Sukhwinder Singh Kaler, Ph.D.(GNDU)

Courses offered

- [B.Tech. \(Food Tech.\)](#)
- [M.Sc. \(Food Tech.\)](#)
- Ph.D.

A) Course Details: B. Tech. (Food Technology)

Distribution of seats								
Course	Duration (Years)	System	Total seats	Quota	Reserved Categories			
					SC/ST	BC	RA	Others
B.Tech. (Food Tech.)	4	Semester	60	85%	13	3	4	5
				15%	2	0	-	-

Eligibility

- a) Senior Secondary Examination (12th grade) with Physics, Chemistry, Mathematics and English with at least 50% marks (45% for SC/ST) in aggregate.

OR

- b) Any other examination recognized equivalent thereto.

Mode of Admission

Admission will be made on the basis of All India Rank of JEE (Main)-2017 for both 85% quota for resident of Punjab and 15% quota for outside Punjab. Application for admission shall be submitted only on-line as per the admission schedule uploaded on GNDU admissions website www.gnduadmissions.org. The counseling will be held at GNDU Campus by the Coordinator Dr.Sandeep Sharma, Professor & Head Department of Computer Engineering. Counseling schedule will be uploaded on GNDU website in due course of time.

Dates

a)	Fee deposit date in State Bank of India (Any Branch)	22.05.2017 to 12.06.2017
b)	Last Date for Online application Form submission	24.05.2017 to 14.06.2017
c)	Admission Counseling	Counseling schedule will be uploaded on GNDU website in due course of time.

Fee (Approximate): Rs. 51060/- (1st Sem.), Rs. 34500/- (2nd Sem.)

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B) Course Details: M.Sc. (Food Technology)

Distribution of seats

Course Name	Duration (Years)	System	Total Seats	Reserved Categories			
				SC/ST	BC	RA	Others
M.Sc. (Food Tech.)	2	Semester	30	7	2	2	4

Eligibility

- (a) Bachelor of Science/Applied Science in any subject, B.Tech. in Food Technology/Bio-technology/Sugar Technology/Sugar and Alcohol Technology with at least 50% marks (45% for SC/ST) in aggregate.

OR

- (b) Any other examination recognized equivalent thereto.

Mode of Admission

The admission will be based on merit of the candidate in the Entrance Test to be conducted by the University in the subject of **Food Technology and Chemistry**. Students can appear in **any one of these subjects**.

Syllabus for the subject of **Food Technology**

1. Food nutrients requirements and deficiency diseases, food groups and concepts of balanced diet.
2. Food adulteration, food laws and food safety.
3. General principles of food processing and preservation by additives, high and low temperature, drying, irradiation, sugar, salt, etc.
4. Preparation of jams, jellies, marmalades, juices, squashes, ketchup, pickles and chutneys.
5. Liquid milk processing, filled and fermented milks. Preparation of milk products- cheese condensed and evaporated milk, whole and skim milk powder and ice

cream.

6. Structure of cereals and their proximate composition, flour and its use in bakery products-bread, biscuits, cakes, doughnut and buns. Additives for bakery industry. Milling of different cereals, parboiling of rice. Pulses: composition, antinutritional factors and utilization.
7. Structure, composition, nutritive value and functional properties of eggs. Slaughter and dressing of poultry and other pet animals. Meat tenderization. Principles of meat preservation.
8. Dimensions and Units. Material and energy balance. Unit operations in food processing.
9. Cell bioconstituents, structure, function and biochemistry and human nutrition. Nutritional significance of carbohydrates, lipids, proteins and nucleic acids.
10. Biochemistry of enzymes, vitamins, mineral elements and their role in nutrition. Composition and functions of blood and lymph, digestion and absorption of carbohydrates, lipids and proteins.
11. Biochemistry of food constituents such as water, lipids, proteins, carbohydrates, minerals, vitamins, enzymes, tannins, coloring and flavoring components.
12. Effects of processing on food constituents.

13. Food spoilage-sources and preservation by physical and chemical means. Microbiology of foods-cereals based products, meat, poultry, eggs, fruits, vegetables, milk, milk products, salts, sugars, etc.
14. Role of microorganisms in fermented foods-bread, malt beverages, wine, vinegar, butter and cheese, etc.
15. Food poisoning and their causative organisms, food borne infections.

16. Principles of food packaging, packaging materials, packaging methods and machinery. Packaging requirements for different food products.

Syllabus for the subject of Chemistry

1. Chemical Bonding and Structure: Ionic Bond: Recapitulation of general characteristics; radius ratio rules, the structures of NaCl, CsCl, ZnS and CaF₂, lattice energy, Born-Haber cycle, covalent character in Ionic compounds, polarising power and polarizability, Fajanlls rules, percentage ionic character from dipole moment and electronegativity difference. Covalent Bond: Valence Bond approach, concept of resonating structures and resonance energy, hybridization of atomic orbitals and VSEPR theory and its use in predicting structures.
2. Molecular orbital approach: Linear combination of atomic orbital, molecular orbitals, electronic configuration of diatomic moleculars ($\text{Be}_2, \text{B}_2, \text{N}_2, \text{O}_2, \text{O}_2^{2+}, \text{O}_2^{2-}, \text{CO}, \text{NO}, \text{CN}, \text{NO}^+, \text{CN}, \text{HF}, \text{HCl}$).
3. Definitions: Complex, ligand, chelate, coordination number, Werner Theory, stereochemistry of different coordination numbers isomerism in coordination compounds, rules of Inorganic nomenclature.

4. Aldehydes and Ketones; Mechanism of nucleophilic addition reactions, oxidation, reduction and reductive amination Ketones, tautomerism Aldol condensation, Wittig reaction, Perkin reaction, Knoevenagel reaction, Cannizzaro reactions, Reformatsky reaction with mechanism.
5. Fats and Oils Analysis: Acid value, Iodine value, saponification. Soaps and detergents.
6. Phase Equilibria: Definition of phase, component and degree of freedom, Criteria of phase equilibria, Gibbs, Phase Rule and its thermodynamics derivation. Derivation of Clausius-Clapeyron equation and its importance in phase equilibria, phase diagrams of water system, KI-water system and lead-silver system.
7. Polymers : Varieties of macromolecules, molecular weight of macromolecules and its distribution, the number average and weight average molecular weights, methods of determining molecular weight, osmotic pressure, sedimentation, viscosity and light scattering methods.
8. Electrochemical Cells: Recapitulation of difference between electrolytic and galvanic cells, meaning of electrode potential and electro-motive force(EMF), Reversible and irreversible cells, measurement of EMF of cell, thermodynamics of a reversible cell, calculation of thermodynamic properties Δ^*G , Δ^*H , Δ^*S from EMF data, Nernst equation, type of electrodes including reference electrodes, Standard electrode potentials, Determination of standard EMF of a cell, Activities, activity coefficients and equilibrium constants from EMF method, Concentration cells (both electrode and electrolyte) with transference and without transference, liquid junction potential. pH determination using hydrogen electrode, glass electrode and quinone-hydroquinone electrode, potentiometric titration: acid-base, redox and precipitation.
9. Adsorption: Difference between adsorption and absorption, factors influencing the adsorption of gases on solids, physisorption and chemisorption, Langmuir theory of adsorption, Langmuir adsorption isotherm, B.E.T theory of multi layer adsorption, Type of adsorption isotherms.
10. Chemical Kinetics: Rate of reaction, rate constant rate expression, factors influencing rate of a reaction order and molecularity rate equation for 1st order reaction, derivation of second order rate equations both for equal, unequal concentrations of reactants, half life time of reaction first and second order reactions, methods for determining the order of a reactions, consecutive reactions, parallel reactions, chain reactions and opposing reactions, influence of temperature on reaction rate, Activation energy and its calculation from Arrhenius equation, collision theory and Activated Complex theory of bimolecular reactions, Comparison of the two theories.
11. Transition Metal Chemistry : Definition, position in the periodic table, division into d- and f block transition elements, electronic configuration of atoms & ions, general characteristics such as size, density, melting & boiling points, oxidation states, ionization. energies, reactivity, complexations, Comparison of the properties of the first transition metal series with 2nd & 3rd transition series.

Origin of paramagnetism, diamagnetism, magnetic susceptibility and magnetic moment from magnetic susceptibility, ferromagnetism and antiferromagnetism (qualitative idea), magnetic behaviour of first row transition metal compounds, qualitative idea of orbital contribution in explaining unusual magnetic moments in first row transition metal compounds.

12. Spectral properties of Transition Metal Compounds: Term, symbols, coupling scheme(L-S), determination of energy states for d^2 configuration only, Crystal Field Theory, Splitting of d-orbitals in octahedral, tetrahedral, square planar & tetragonally distorted geometry, CFSE, spectrochemical series, magnetic properties from crystal field theory, selection rules of electronic spectra, nature of electronic transition in complexes with d^1 - d^2 configurations in octahedral and tetrahedral fields (simple energy level Orgel diagrams only), special features of electronic spectra of Cr(III)- octahedral Mn(II) octahedral, Co(II) - tetrahedral and Ni(II)-octahedral.
13. The f-type of elements: Lanthanides: Electronic structure and position in the periodic table, oxidation states, spectral and magnetic properties, lanthanide contraction and similarity in properties, occurrence, separation of lanthanides by ion exchange method. Actinides: Electronic structure and comparison with lanthanides, oxidation states, extraction of thorium and uranium from their ores.
14. Organometallic Compounds and π -acid complexes. Definition, types of organometallic compounds, classification of ligands, EAN and nomenclature bonding, metal-carbon bonding, metal-carbon multiple bonding.
15. Reactive Intermediates Carbocation, Free radicals, carbenes and Nitrenes (Structure stability and reaction).
16. Rearrangement: Banzidine, Beckmann, Schmidt Wagner-Meerwin, cope and Claisen rearrangement.
17. Heterocyclics: Structure formula of five and six membered heterocyclic with one hetero atom (furan, Pyrole, thiophene and pyridine), electrophilic substitution reaction. Mention of formula of pyrrolidine, piperidine, quinoline and isoquinoline.
18. Natural Products: Introduction to oils and fats stereoids, terpenoids and alkaloids, nomenclature, isoprene rules, synthesis and structure elucidation of camphor, citral, nicotine with special mention of estrone.

Dates

a)	Fee deposit date in State Bank of India (Any Branch)	05.06.2017 to 27.06.2017
b)	Last Date for Online application Form submission	07.06.2017 to 30.06.2017
c)	Entrance Test	12.07.2017 (10.00 a.m. - 11.30 a.m.)
d)	Admission Counseling	14.07.2017

Venue & Reporting time for Entrance Test

Department of Food Science & Technology, GNDU, Amritsar at 10.00 a.m.

Fee (Approximate): Rs. 36310/- (1st Sem.), Rs. 20750/- (2nd Sem.)

Special Features

The department has been established to generate skilled manpower to meet the requirements of food processing, sugar & alcohol industry. The department has specialized laboratories in the areas of (1) Cereals, legumes and oilseeds processing; (2) Fruits and vegetables processing; (3) Meat, fish and poultry processing; (4) Milk, and milk products processing; (5) Food analysis and quality control; (6) Food engineering; (7) Product development; (8) Sugar processing; (9) Sugar testing; (10) Alcohol technology; and (11) Sophisticated instrumentation laboratory. In addition to theoretical knowledge, the students are also given in-plant industrial training.

The laboratories are equipped with sophisticated instruments like UV-Spectrophotometer, Farinograph, Viscoamylograph, Alveograph, Mixolab, Amino Acid Analyser, Spray dryer, Freeze dryer, Electrophoresis, Differential scanning calorimeter, Dynamic rheometer, Rapid visco analyser, Moisture analyser, Brookefield viscometer, Texture analyser, HPLC, Hunter colour lab, sucrolyser system, Karl fischer titrator, NIR-spectrophotometer and sucro scan. The department has pilot scale processing facilities for fruits and vegetables, bakery, extruded & pasta products.

Contact

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