

Scheme & Syllabus of

Bachelor of Science (Hons) in Nutrition and Dietetics

B.Sc. (Hons) Nutrition and Dietetics

Batch 2025 onwards



By

Board of Study Food Science and Engineering

Department of Academics

I.K. Gujral Punjab Technical University

Vision:

To become a center of excellence in nutrition and dietetics education, fostering scientific innovation, ethical practice, and community well-being through transformative learning and evidence-based dietary science.

Mission:

- To provide a robust academic foundation in nutritional sciences, food technology, and health promotion.
- To nurture professionals with ethical integrity, communication skills, and research aptitude for effective dietetic practice.
- To promote community engagement and public health through culturally relevant and sustainable nutritional interventions.
- To foster lifelong learning and interdisciplinary collaborations that address national and global health challenges.

I.K. Gujral Punjab Technical University
B.Sc. (Hons) Nutrition and Dietetics, Batch 2025 onwards

Program Name:	Bachelor of Science (Hons) in Nutrition and Dietetics Or B.Sc. (Hons) in Nutrition and Dietetics
Program Level	Undergraduate (UG) Programme
Duration	4 years (8 Semesters)
Eligibility for Admission	A Candidate who has passed 10+2 or equivalent with Physics, Chemistry and Mathematics/Biology/ Agriculture/Home Science with at least 50% marks in aggregate.
Year of Implementation	New Syllabus will be implemented from 2025 onwards.
Medium of Instruction	English

Program Education Objectives:

- PEO1 Scientific Competence and Application:** Graduates will acquire a robust foundation in human nutrition, physiology, biochemistry, and food science, enabling them to assess nutritional status and apply scientific principles to individual and community health.
- PEO2 Professional Skills, Ethics, and Communication:** Graduates will demonstrate ethical conduct, effective communication, and client-centered counseling skills required in clinical, food industry, public health, and wellness settings.
- PEO3 Research Orientation and Lifelong Learning:** Graduates will engage in research-based thinking, critical analysis, and evidence-based decision-making, while continuously upgrading knowledge to meet global nutrition and health trends.
- PEO4 Public Health Impact and Societal Engagement:** Graduates will contribute to nutrition advocacy, community outreach, and sustainable health solutions that improve nutritional outcomes at local and national levels.

Program Outcomes:

- PO1 Core Nutritional Knowledge and Integration:** Apply foundational knowledge in nutrition, biochemistry, physiology, and food science to assess dietary needs and implement nutritional solutions for individuals and populations.
- PO2 Ethical Practice and Communication:** Demonstrate empathy, professional ethics, and effective communication while working with diverse populations in healthcare, research, and wellness sectors.
- PO3 Scientific Inquiry and Critical Thinking:** Critically analyze nutritional data, engage in research, and apply evidence-based approaches to solve real-world health and dietetic challenges.
- PO4 Technological Adaptation and Sustainability:** Utilize digital tools, food analysis software, and sustainable nutrition practices in food service operations, public health, and industry-based settings.
- PO5 Lifelong Learning and Community Health Engagement:** Commit to continuous professional growth and actively participate in health education, nutrition policy, and public health programs to serve society.

Mapping of Program Outcomes with Program Education Objectives: - Formulation of Program Outcomes with Program Education Objectives matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

PO \ POE	POE1	POE2	POE3	POE4
PO1	3	3	2	3
PO2	3	3	3	2
PO3	2	3	3	3
PO4	3	2	3	3
PO5	3	3	3	3

SEMESTER-II

I.K. Gujral Punjab Technical University
B.Sc. (Hons) Nutrition and Dietetics

Course Code	Course Title	Load Allocation			Marks Distribution		Total	Credits
		L	T	P	Internal	External		
BSND121-25	Basics of Cooking	3	1	0	40	60	100	4
BSND122-25	Food Processing & Preservation	3	1	0	40	60	100	4
BSND123-25	Food Chemistry	3	1	0	40	60	100	4
BSND124-25	Food Packaging	3	1	0	40	60	100	4
BSND125-25	Basics of Cooking (Lab)	0	0	4	30	20	50	2
BSND126-25	Food Processing & Preservation (Lab)	0	0	4	30	20	50	2
BSND127-25	Food Chemistry (Lab)	0	0	4	30	20	50	2
EVS102-18	Environmental Science	2	0	0	40	60	100	2
BSND128-25	Basics of Computer	2	0	0	20	30	50	2
BSND129-25	Mentoring & Professional Development	0	0	1	25	--	25*	1
	Total	16	4	13	335	390	725	27

*The Mentoring & Professional Development course will have internal evaluation only.

BSND121-25: BASICS OF COOKING

Course outcome: At the end of the course, the students will be able to

CO1	Develop an understanding of kitchen organization, including appropriate attire, personal hygiene, safety practices, and the selection, use, care, and maintenance of kitchen equipment.
CO2	Explain common culinary terminology and the fundamental principles of cooking, including heat transfer methods, temperature control, and the physical and chemical changes that occur in food during cooking.
CO3	Apply principles and practices of various cooking methods such as boiling, steaming, frying, roasting, baking, pressure cooking, grilling, microwave cooking, and combination methods for different food groups.
CO4	Explain the effects of different cooking techniques on texture, flavour, digestibility, and nutritional value of foods, and implement strategies to minimize nutrient loss during food preparation.
CO5	Demonstrate basic culinary skills including recipe standardization, portion control, menu planning, use of thickening and binding agents, preparation of stocks, and planning of balanced and therapeutic diets.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	2	3	1	2	1
CO2	3	1	2	1	1
CO3	3	1	2	2	1
CO4	3	1	3	2	2
CO5	3	2	2	2	3

BSND121-25: BASICS OF COOKING

Total Marks: 100

L	T	P
3	1	0

UNIT- I

Kitchen attire and equipment: Types, uses, care and maintenance of large and small kitchen tools, personal hygiene, and safety measures.

Terminology used in cooking: Common culinary terms and basic food preparation vocabulary.

Effects of cooking on food: Physical and chemical changes, impact on texture, flavour, digestibility, and nutritive value, and measures to reduce nutrient loss during cooking.

Cooking of food: Heat, temperature, and methods of heat transfer such as conduction, convection, and radiation. Classification of cooking methods into moist heat, dry heat, and combination methods.

UNIT- II

Principles and practices of boiling, simmering, steaming, frying (shallow and deep), stewing, pressure cooking, roasting, and baking: Correct procedures, temperature control, advantages, limitations, and suitability for different food groups such as cereals, pulses, vegetables, fruits, meat, poultry, fish, eggs, and milk products.

UNIT- III

Principles and practices of braising, grilling, infrared cooking, microwave cooking, and combined methods of cookery: Understanding of equipment used, temperature regulation, safety precautions, and suitability of each method for different food groups. Application of combination cooking techniques to improve flavour, texture, and overall quality of prepared foods.

UNIT- IV

Basics of culinary practices: Importance of culinary skills, recipe standardization, portion control, and presentation.

Types of menus: À la carte, Table d'hôte, buffet, cyclic, and institutional menus.

Types of different diets: Balanced, therapeutic, vegetarian, non-vegetarian, and special diets for specific health conditions.

Thickening and binding agents: Roux, starches, gelatin, and eggs.

Flavoring stocks: Stock types, their preparation, importance, essences, and glazes.

Recommended Readings:

1. B. Shrilakshmi, Food Science, Ed. 9, New Age International Publishers.
2. N. Shakuntala Manay & M. Shadaksharaswamy, Food: Facts and Principles, Ed. 4, New Age International Publishers.

BSND122-25: FOOD PROCESSING & PRESERVATION

Course outcome: At the end of the course, the students will be able to

CO1	Explain the scope, importance, and principles of food preservation, causes of food spoilage, shelf-life concepts, and the role and classification of microorganisms associated with foods.
CO2	Describe food preservation methods using low and high temperatures, including refrigeration, freezing, pasteurization, sterilization, blanching, and their effects on food quality.
CO3	Describe preservation techniques based on moisture control such as drying, dehydration, and evaporation, including their principles, equipment, and factors affecting efficiency.
CO4	Explain the principles and applications of food preservation by irradiation and chemical preservatives, including mechanisms of action, types of preservatives, and their effects on food safety and quality.
CO5	Compare and assess different food preservation methods in terms of effectiveness, suitability for various food types, and impact on shelf life, safety, and nutritional quality.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-
Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	3	1	2	1	1
CO2	3	1	2	2	1
CO3	3	1	3	2	1
CO4	3	2	2	2	1
CO5	3	2	3	2	2

BSND122-25: FOOD PROCESSING & PRESERVATION

Total Marks: 100

L T P
3 1 0

UNIT- I

Scope and importance of food preservation, Historical developments in food processing. Types of foods and causes of food spoilage. Definition of shelf life, perishable foods, semi perishable foods, shelf stable foods. Principles of Food Preservation.

Food Microbiology: microorganisms associated with foods- bacteria, yeast and mold, Importance of bacteria, yeast and molds in foods. Classification of microorganisms based on temperature, pH, water activity, nutrient and oxygen requirements, typical growth curve of micro-organisms.

UNIT- II

Food Preservation by Low temperature

Freezing and Refrigeration: Introduction to refrigeration, cool storage and freezing, definition, principle of freezing, freezing curve, changes occurring during freezing, types of freezing i.e. slow freezing, quick freezing, introduction to thawing, changes during thawing and its effect on food.

Food Preservation by high temperature

Thermal Processing- Commercial heat preservation methods: Sterilization, commercial sterilization, Pasteurization, and blanching.

UNIT- III

Food Preservation by Moisture control

Drying and Dehydration - Definition, drying as a means of preservation, differences between sun drying and dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying, normal drying curve, names of types of driers used in the food industry.

Evaporation – Definition, factors affecting evaporation, names of evaporators used in food industry.

UNIT- IV

Food Preservation by Irradiation

Introduction, units of radiation, kinds of ionizing radiations used in food irradiation, mechanism of action, uses of radiation processing in food industry, concept of cold sterilization.

Food Preservation by Preservatives: Uses and effects of class I and class II preservatives in foods.

Recommended Readings:

1. Sivasankar, B. *Food processing and preservation*: Hall of India Pvt., New Delhi.
2. B. Shrilakshmi, *Food Science*, Ed. 9, New Age International Publishers.
3. R.P. Srivastava & Sanjeev Kumar, *Fruits and Vegetable Preservation Principles and Practices*, Ed. 3, CBS Publishers and Distributors Pvt. Ltd.
4. Bawa. A.S, O.P Chauhan et al. *Food Science*. New India Publishing agency.
5. Fellows, P. J. *Food processing Technology: Principles and Practice*: Woodhead Publishing.
6. Brennan, J. G. (2006). *Food Processing Handbook*: Weinheim: Wiley-VCH.
7. Zeuthen, P. & Bogh- Sprensen, L. (2003). *Food Preservation Techniques*: CRC Press, Boca raton.
8. Vonloesecka, H. W. (1998). *Drying and Dehydration of Foods*: Allied, Bikaner.
9. Frazier WC and Westhoff DC, *Food Microbiology*, TMH Publication, New Delhi, 2004

BSND123-25: Food Chemistry

Course outcome: At the end of the course, the students will be able to

CO1	Explain the fundamental concepts, scope, and development of food chemistry, with special emphasis on the structure, properties, and role of water and water activity in food stability and shelf life.
CO2	Describe the classification, structure, chemical reactions, and functional properties of carbohydrates and proteins, and analyse their behaviour in food systems.
CO3	Evaluate the physical and chemical properties of lipids, including quality assessment parameters, processing technologies, and changes occurring during storage and frying.
CO4	Explain the significance, stability, enrichment, and fortification of water-soluble and fat-soluble vitamins during food processing and storage.
CO4	Analyse the chemical nature of food flavours, including flavour compounds and enhancers, and their contribution to sensory characteristics and overall food quality.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	3	–	2	2	1
CO2	3	–	3	2	1
CO3	3	–	3	3	1
CO4	3	–	2	2	2
CO5	2	–	2	2	1

BSND123-25: Food Chemistry

Total Marks: 100

L	T	P
3	1	0

UNIT- I

Introduction to Food Chemistry: Definition, nature, scope and development of food chemistry.

Water: Definition of water in food, Structure of water and ice, Types of water, Sorption phenomenon, Water activity and packaging, Water activity and shelf-life.

UNIT- II

Carbohydrates: Classification (mono, oligo and polysaccharides); Structure of important polysaccharides (starch, glycogen, cellulose, pectin, hemicellulose, gums); Chemical reactions of carbohydrates –oxidation, reduction, with acid & alkali; Modified celluloses and starches

Proteins: Protein classification and structure; Nature of food proteins (plant and animal proteins); Properties of proteins (electrophoresis, sedimentation, amphoterism, and denaturation); Functional properties of proteins (e.g., organoleptic properties, solubility, viscosity, binding, gelation/texturization, emulsification, and foaming).

UNIT- III

Lipids: Classification of lipids, Physical properties-melting point, softening point, specific gravity, refractive index, smoke, flash and fire point, turbidity point. Chemical properties: Reichert–Meissl (RM) value, Polenske value, iodine value, peroxide value, saponification value. Effect of frying on fats; Changes in fats and oils- rancidity, lipolysis, flavor reversion; Auto-oxidation and its prevention; Technology of edible fats and oils- Refining, Hydrogenation and Interesterification, Fat Mimetics.

UNIT- IV

Vitamins: Significance and stability of vitamins during processing, enrichment, fortifications; Water soluble vitamins; Fat soluble vitamins.

Flavour: Description of food flavours; Flavour enhancers; Flavor compounds -terpenoids, flavonoids, Sulphur compounds and volatile flavor compounds.

Recommended readings:

1. Satyanarayana, U & Chakrapani U. Biochemistry, 4th Ed., Elsevier India
2. Harish Kumar Chopra & Paramjit Singh Panesar. Food Chemistry, Narosa, India.
3. Fennema, Owen R, Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996
4. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002
5. Wong, Dominic WS, Food Enzymes, Chapman and Hall, New York, 1995
6. Potter, N.N. and Hotchkiss, J.H, Food Science, 5th Ed., Chapman & Hall, 1995
7. DeMan, J.M., Principles of Food Chemistry, AVI, New York, 1980

BSND124-25: FOOD PACKAGING

Course outcome: At the end of the course, the students will be able to

CO1	Explain the principles and functions of food packaging in preserving nutritional quality, including packaging regulations, labelling requirements, barcodes, and their impact on food safety and consumer health choices.
CO2	Describe different packaging materials such as paper, biodegradable materials, plastics, laminates, metals, and glass, and evaluate their suitability for nutrient-sensitive foods and environmental sustainability.
CO3	Apply packaging strategies for fresh and processed foods to minimize nutrient loss, including permeability testing and regulatory aspects related to nutrient claims.
CO4	Describe packaging machinery and advanced systems such as aseptic, intelligent, and active packaging in protecting nutritional quality during storage and transportation.
CO5	Understand methods used to measure packaging performance and determine its impact on nutrient retention, shelf life, and overall nutritional worthiness of food products.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	2
CO2	2	1	2	3	2
CO3	3	2	3	3	2
CO4	2	1	2	3	1
CO5	3	1	3	2	1

BSND124-25: FOOD PACKAGING

Total Marks: 100

L	T	P
3	1	0

UNIT- I

Introduction to food packaging-Functions of packaging in preserving nutritional quality.

Packaging regulations and labelling requirements for nutritional information –Barcodes and other markings, impact of packaging on food safety and consumer health choices.

Overview of packaging types and their effect on nutrient retention.

UNIT- II

Paper and biodegradable materials for nutrient sensitive foods.

Plastics and laminates- Selection based on nutrient preservation.

Metal packaging {tin plates, cans} and their influence on micronutrient stability.

Glass-Properties, uses and types of containers used in food packaging,

Environmental sustainability in nutrition packaging and recycling practices.

UNIT- III

Packaging strategies for fresh produce to maintain vitamins and antioxidants.

Packaging for processed foods to minimize nutrient loss-Frozen, fortified foods and convenience foods.

Testing packaging for oxygen and moisture permeability affecting nutritional value.

Regulatory aspects of nutrient claims on packed foods.

UNIT- IV

Packaging machinery for aseptic and intelligent packaging that protects nutritional quality.

Evaluation of packaging performance in transport and storage regarding nutrient retention.

Methods to assess packaging's effect on food nutritional worthiness.

Active packaging systems that enhance shelf life and nutrient stability.

Recommended readings:

1. Robertson GL, Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group,2012
2. Coles R, McDowell D, Kirwan MJ Food Packaging Technology. Blackwell, 2003
3. Paine FA and Paine HY, A Handbook of Food Packaging, Blackie Academic and Professional, 1992

BSND125-25: BASICS OF COOKING (LAB)

Course outcome: At the end of the course, the students will be able to

CO1	Demonstrate the preparation of basic recipes from different food groups such as cereals, pulses, eggs, vegetables, fruits, and milk products following standard procedures.
CO2	Apply various cooking methods including boiling, steaming, frying, stewing, roasting, braising, grilling, microwave cooking, and combination methods in practical food preparation.
CO3	Develop skills in maintaining hygiene, safety, time management, and proper use of kitchen equipment during laboratory practice.
CO4	Demonstrate the effect of different cooking methods on texture, flavour, appearance, and overall acceptability of prepared dishes.
CO5	Practice portion control, presentation techniques, and recipe standardization to ensure consistency and quality in food preparation.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	2	1
CO2	3	1	2	3	1
CO3	2	3	1	2	2
CO4	2	1	3	1	1
CO5	2	2	2	2	1

BSND125-25: BASICS OF COOKING (LAB)

Total Marks: 50

L	T	P
0	0	4

Course Contents:

1. **Preparation of recipes from different food groups, such as**
 - a. **Cereals** – Vegetable Pulao / Plain Rice / Upma
 - b. **Pulses** – Moong Dal Tadka / Rajma Curry / Chole
 - c. **Eggs** – Boiled Egg / Omelette / Egg Curry
 - d. **Vegetables** – Mixed Vegetable Curry / Vegetable Stir Fry
 - e. **Fruits** – Fruit Salad / Banana Shake / Apple Custard
 - f. **Milk** – *Kheer* / Custard / Paneer Preparation

2. **Preparation of food products using various cooking methods**
 - a. **Boiling** – Boiled Rice / Boiled Vegetables / Boiled Eggs
 - b. **Steaming** – *Idli* / Steamed Vegetables / Dhokla
 - c. **Frying** – *Poori* / *Pakora* / French Fries
 - d. **Stewing** – Vegetable Stew / Chicken Stew
 - e. **Roasting** – Roasted Peanuts / Roasted Chicken / Roasted Vegetables
 - f. **Braising** – Braised Vegetables / Braised Chicken
 - g. **Grilling** – Grilled Sandwich / Grilled Paneer / Grilled Chicken
 - h. **Microwave Cooking** – Microwave Mug Cake / Steamed Vegetables (Microwave)
 - i. **Methods in Combination** – Biryani (Boiling + Dum Cooking) / Shahi Paneer (Frying + Stewing)

BSND126-25: FOOD PROCESSING & PRESERVATION (LAB)

Course outcome: At the end of the course, the students will be able to

CO1	Apply appropriate sampling techniques and prepare representative test samples for food quality and preservation analysis.
CO2	Perform laboratory techniques related to food preservation such as pasteurization, blanching, dehydration, pickling, curing, bottling, and aseptic practices.
CO3	Determine and interpret key physicochemical parameters including pH, moisture content, and sodium chloride concentration in preserved foods.
CO4	Understand the effects of different preservation methods such as drying, freezing, canning, microwave processing, and use of chemical preservatives on food quality and shelf life.
CO5	Understand microbial stability and safety aspects of preserved foods through practical assessment of pH, sterilization methods, and cut-out analysis of canned products.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	3	1	3	2	1
CO2	3	2	2	3	1
CO3	3	1	3	2	1
CO4	3	1	3	3	1
CO5	3	3	3	2	2

BSND126-25: FOOD PROCESSING & PRESERVATION (LAB)

Total Marks: 50

L	T	P
0	0	4

Course Contents:

1. Sampling techniques and preparation of test samples.
2. Concept of shelf life of different foods
3. To study the concept of Asepsis and sterilization
4. Determination of pH of different foods using pH meter.
5. Study quality characteristics of foods preserved by drying/dehydration/ freezing.
6. To perform pasteurization of fluids using different methods.
7. To perform blanching of different plant foods.
8. Pickling and curing of foods.
9. Determination of sodium chloride in brine.
10. Determination of moisture content in fresh and dried food samples.
11. Effect of pH on microbial stability of food.
12. Dehydration of foods.
13. Use of chemical preservatives in food.
14. Preservation of food by bottling (Fruit/Vegetable/meat).
15. Cut-out analysis of canned food.
16. Comparison of conventional and microwave processing of food.

BSND127-25: FOOD CHEMISTRY (LAB)

Course outcome: At the end of the course, the students will be able to

CO1	Prepare primary and secondary standard solutions accurately and apply principles of volumetric and analytical techniques in food analysis.
CO2	Determine proximate composition of foods by estimating moisture, crude fat, protein, and carbohydrate content using standard laboratory methods.
CO3	Understand physicochemical properties of fats, and oils including, refractive index, specific gravity, free fatty acids, and saponification value.
CO4	Describe quality parameters of fats and oils such as smoke point and fat absorption, and interpret their significance in food processing and stability.
CO5	Develop skills in handling laboratory instruments, maintaining accuracy and precision, and interpreting experimental data related to food chemistry.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	3	–	2	2	–
CO2	3	–	3	2	–
CO3	3	–	3	2	–
CO4	3	–	2	2	–
CO5	2	2	3	2	1

BSND127-25: FOOD CHEMISTRY (LAB)

Total Marks: 50

L	T	P
0	0	4

Course Content:

1. Preparation of primary and secondary solutions.
2. Estimation of moisture content.
3. Estimation of crude fat content by Soxhlet extraction method.
4. Estimation of protein content by Kjeldahl method.
5. Estimation of reducing and non-reducing sugars using potassium ferricyanide method.
6. Determination of the pasting temperature range of different starches and effect of additives on it.
7. Determination of refractive index and specific gravity of fats and oils.
8. Determination of percent free fatty acids.
9. Estimation of saponification value.
10. Determination of smoke point and percent fat absorption for different fats and oils.

EVS102-18: ENVIRONMENT STUDIES

Course outcome: At the end of the course, the students will be able to

CO1	Develop an understanding of the multidisciplinary nature, scope, and importance of environmental studies, including the principles of sustainability and sustainable development.
CO2	Explain the structure and functioning of ecosystems, energy flow, ecological succession, and analyze different types of ecosystems and natural resources.
CO3	Create awareness about biodiversity, its conservation strategies, ecosystem services, and the environmental challenges associated with resource depletion and habitat loss.
CO4	Examine the causes, effects, and control measures of environmental pollution, climate change, and other global environmental issues, along with relevant environmental laws and policies.
CO5	Encourage environmental responsibility through the study of human–environment interactions, environmental movements, disaster management, ethics, and field-based learning experiences.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	2	1	2	3	2
CO2	3	–	2	2	1
CO3	2	2	2	3	3
CO4	2	2	3	3	2
CO5	1	3	2	2	3

EVS102-18: ENVIRONMENT STUDIES

Total Marks: 100

L	T	P
2	0	0

UNIT- I

Introduction to environmental studies

- Multidisciplinary nature of environmental studies; Scope and importance; Concept of sustainability and sustainable development.

UNIT- II

Ecosystems

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems:
 - a) Forest ecosystem
 - b) Grassland ecosystem
 - c) Desert ecosystem
 - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT- III

Natural Resources: Renewable and Non-renewable Resources

- Land resources and land use change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations
- Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

UNIT- IV

Biodiversity and Conservation

- Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity: Habitat loss, poaching of wildlife, man- wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex- situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

UNIT- V

Environmental Pollution

- Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste.
- Pollution case studies.

UNIT- VI

Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

UNIT- VII

Human Communities and the Environment

- Human population growth: Impacts on environment, human health and welfare.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management: floods, earthquake, cyclones and landslides.
- Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

UNIT- VIII: Field work

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river, Delhi Ridge, etc.

Recommended readings:

1. Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.
2. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
3. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
4. Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
5. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
6. Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
7. Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
8. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press
9. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. *Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
10. McCully, P. 1996. *Rivers no more: the environmental effects of dams* (pp. 29-64). Zed Books.
11. McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
12. Odum, E.P., Odum, H.T. & Andrews, J. 1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
13. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. *Environmental and Pollution Science*. Academic Press.
14. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
15. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. *Environment*. 8th edition. John Wiley & Sons.
16. Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India*. Tripathi 1992.
17. Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
18. Wilson, E. O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.

BSND128-25: BASICS OF COMPUTERS

Course outcome: At the end of the course, the students will be able to

CO1	Explain basic computer fundamentals including data and information concepts, components of a computer system, hardware elements, generations of computers, and input/output devices.
CO2	Describe software concepts, types of software, programming language classifications, operating system functions, and perform basic file and folder management using Windows OS.
CO3	Demonstrate practical skills in using MS Office applications including document creation in Word, basic calculations in Excel, and preparation of presentations in PowerPoint.
CO4	Explain the basic concepts and applications of emerging technologies such as Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), cloud computing, and cybersecurity.
CO5	Apply fundamental computer knowledge and digital skills for academic, professional, and everyday problem-solving tasks.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	2	1
CO2	2	1	2	3	1
CO3	2	1	2	3	2
CO4	1	1	2	3	2
CO5	2	1	2	3	3

BSND128-25: BASICS OF COMPUTERS

Total Marks: 50

L	T	P
2	0	0

UNIT-I

Computer Fundamentals – Theory - Meaning of Data and Information; Information Processing Concepts; Need, Quality and Value of Information; Data Processing Concepts

Elements of a Computer System – Definition, classification, characteristics, limitations of Computers

Basic Hardware Concepts – Components of a Computer System (CPU, ALU, Control Unit, Memory); Generations of Computers (Overview); Primary and Secondary Storage Devices; Input Devices (Keyboard, Mouse, Scanner, etc.); Output Devices (Monitor, Printer, Speakers, etc.)

UNIT- II

Software Concepts – Meaning and Types of Software, System Software and Application Software, Language Classification (Machine, Assembly, High-Level Languages), Basic Concept of Compilers and Interpreters

Operating System – Meaning and Functions of Operating System, Basics of Internal and External Commands, File and Folder Management

Introduction to Windows Operating System – Graphical User Interface (GUI) Features, Parts of a Typical Window and their Functions, Basic Windows Operations

UNIT- III

MS Office: Introduction to Microsoft Office – Basics, MS Office components, and uses.

Word Processing (Microsoft Word) - Creating and Editing Documents, Formatting Text and Paragraphs, Tables and Printing.

Spreadsheets (Microsoft Excel) – Workbook and Worksheet Basics, Simple Formulas and Functions.

Microsoft PowerPoint – Creating Simple Presentations, Slide Layout and Design, Basic Animations and Slide Show

UNIT- IV

Emerging technologies: Introduction to Artificial Intelligence (AI) – Meaning and definition, applications of AI, Machine Learning (ML) basics, AI in daily life. Introduction to Internet of Things (IoT) – Basic concept, smart devices and sensors, IoT application. Basic awareness – Cloud computing, cybersecurity

Recommended Readings:

1. Fundamentals of Computers, Prentice Hall India
2. Mastering Microsoft Office, Lonnie. E. Moseley, BPB Publications

BSND129-25: MENTORING AND PROFESSIONAL DEVELOPMENT

Course outcome: At the end of the course, the students will be able to

CO1	Develop overall personality traits including self-confidence, leadership qualities, teamwork, and professional ethics through structured class and outdoor activities.
CO2	Enhance technical and general aptitude skills through participation in aptitude tests, quizzes, expert lectures, and analytical discussions.
CO3	Improve communication and presentation skills through group discussions, student presentations, and interactive learning sessions.
CO4	Demonstrate general awareness of current affairs and professional trends through active engagement in quizzes, discussions, and knowledge-sharing activities.
CO5	Participate effectively in sports, NSS/NCC, and professional society or club activities to foster social responsibility, collaboration, and holistic professional development.

Mapping of Course Outcomes with Program Outcomes: Formulation of Course Outcomes-
Program Outcomes matrix with correlation values as 1 (Low), 2 (Medium), 3 (High)

	PO1	PO2	PO3	PO4	PO5
CO1	1	3	1	1	3
CO2	1	2	3	1	2
CO3	1	3	2	1	2
CO4	1	2	2	1	3
CO5	1	3	1	1	3

BSND129-25: MENTORING AND PROFESSIONAL DEVELOPMENT

Total Marks: 25

L	T	P
1	0	0

Details of the Course Content - Mentoring and Professional Development:

The course shall be split in two sections i.e. outdoor activities and class activities. For achieving the above, suggestive list of activities to be conducted are:

Practical no.	Contents	Contact Hours
	Part – A (Class Activities)	14
1	Expert and video lectures	
2	Aptitude Test	
3	Group Discussion	
4	Quiz (General/Technical)	
5	Presentations by the students	
6	Team building Exercises	
	Part – B (Outdoor Activities)	
1	Sports/NSS/NCC	
2	Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc	

The evaluation shall be based on rubrics for Part – A & B Mentors/Faculty incharges shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.