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|  | THE NATIONAL COLLEGE BASAVANGUDI, BANGALORE-560004 [AUTONOMOUS] DEPARTMENT OF CHEMISTRY | |
| | FOOD AND NUTRITION | |
| | Duration: 30 Hours | Course code: CH-FN |

Course Description:

The Food and Nutrition course provides students with a comprehensive understanding of the principles of nutrition, dietary requirements, and their impact on health and well-being. Through a combination of theoretical lectures, practical demonstrations, and hands-on activities, students will learn about the various components of a healthy diet, nutrient metabolism, dietary guidelines, and the role of nutrition in preventing and managing diseases. Emphasis will also be placed on analysing food labels, meal planning, and promoting healthy eating habits.

Course Objectives:

1. Understand the fundamentals of nutrition, including macronutrients, micronutrients, and their functions in the body.
2. Gain knowledge of dietary guidelines and recommendations for different population groups.
3. Learn to assess dietary intake and evaluate nutritional status.
4. Explore the relationship between nutrition and common health conditions, such as obesity, diabetes, and cardiovascular disease.
5. Develop skills in meal planning, food preparation, and healthy cooking techniques.
6. Understand the importance of food safety and sanitation practices.
7. Explore contemporary issues in food and nutrition, such as sustainable food systems and food security.

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| Module 1: | 7 Hours |
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Introduction to Nutrition

- Definition of nutrition and its importance
- Basic concepts in nutrition: macronutrients, micronutrients, and energy balance
- Dietary guidelines and recommendations

Macronutrients: Carbohydrates, Proteins, and Fats

- Functions of carbohydrates, proteins, and fats in the body
- Food sources, digestion, and metabolism of macronutrients
- Recommended intake and dietary considerations
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| Module 2: | 7 Hours |
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Micronutrients: Vitamins and Minerals

- Roles and functions of vitamins and minerals
- Food sources, absorption, and metabolism of micronutrients



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| <ul style="list-style-type: none"> • Deficiency and toxicity disorders <p>Dietary Assessment and Nutritional Status</p> <ul style="list-style-type: none"> • Methods of dietary assessment (e.g., food diary, 24-hour recall, food frequency questionnaire) • Nutritional screening and assessment tools • Interpretation of nutritional data • | |
| Module 3: | 8 Hours |
| <p>Nutrition and Health</p> <ul style="list-style-type: none"> • Nutrition-related health conditions (e.g., obesity, diabetes, heart disease) • Role of nutrition in disease prevention and management • Dietary modifications for specific health conditions <p>Meal Planning and Healthy Eating</p> <ul style="list-style-type: none"> • Principles of balanced eating • Meal planning strategies for different dietary needs (e.g., vegetarian, gluten-free) • Portion control and mindful eating | |
| Module 4: | 8 Hours |
| <p>Food Safety and Sanitation</p> <ul style="list-style-type: none"> • Principles of food safety and hygiene • Hazard analysis and critical control points (HACCP) • Safe food handling practices <p>Contemporary Issues in Food and Nutrition</p> <ul style="list-style-type: none"> • Sustainable food systems and environmental impact • Food insecurity and hunger • Food labelling and marketing practices | |
| Recommended Textbooks: | |
| <ul style="list-style-type: none"> • "Understanding Nutrition" by Ellie Whitney and Sharon Rady Rolfes • "Nutrition: Concepts and Controversies" by Frances Sizer and Ellie Whitney • "Food and Culture" by Carole Counihan and Penny Van Esterik | |



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|  | THE NATIONAL COLLEGE BASAVANGUDI, BANGALORE-560004 [AUTONOMOUS] | |
| | DEPARTMENT OF CHEMISTRY | |
| | INDUSTRIAL CHEMISTRY | |
| | Duration: 30 Hours | Course code: CH-IC |

Course Description:

The Industrial Chemistry course offers students an in-depth exploration of chemical processes and technologies used in various industries. Through theoretical lectures, laboratory experiments, case studies, and industrial visits, students will learn about the principles of industrial chemistry, chemical engineering principles, process optimization, and safety considerations. Emphasis will be placed on understanding the role of chemistry in industrial processes, sustainability, and the economic impact of chemical industries.

Course Objectives:

1. Understand the principles and concepts of industrial chemistry.
2. Gain knowledge of chemical processes used in different industrial sectors.
3. Learn about chemical engineering principles and unit operations.
4. Develop skills in process optimization, troubleshooting, and quality control.
5. Explore the applications of industrial chemistry in manufacturing, energy production, and environmental remediation.
6. Understand safety protocols and regulations in chemical industries.

Module 1: **7 Hours**


- Introduction to Industrial Chemistry
- Overview of chemical industries and their importance
 - Historical perspective and evolution of industrial chemistry
 - Economic significance and contributions to societal development
- Chemical Process Technology
- Fundamentals of chemical reactions and stoichiometry
 - Chemical engineering principles and unit operations (e.g., distillation, filtration, reaction kinetics)
 - Thermodynamics and phase equilibria in industrial processes
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Module 2: **7 Hours**

- Chemical Process Design and Optimization
- Design considerations for chemical processes (e.g., scale-up, reactor design)
 - Optimization techniques for maximizing yield, efficiency, and sustainability
 - Process simulation and modelling using software tools
- Industrial Catalysis and Reaction Engineering
- Role of catalysts in industrial processes
 - Types of catalysis (e.g., homogeneous, heterogeneous)
 - Reaction engineering principles and kinetics



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| Module 3. | 8 Hours |
| Separation Techniques in Industrial Chemistry <ul style="list-style-type: none"> • Distillation and fractionation processes • Extraction techniques (e.g., liquid-liquid extraction, solid-phase extraction) • Membrane separation processes (e.g., reverse osmosis, ultrafiltration) Industrial Polymers and Materials Chemistry <ul style="list-style-type: none"> • Production of polymers and plastics • Polymerization techniques and polymer processing • Applications of industrial polymers in manufacturing and construction | |
| Module 4: | 8 Hours |
| Industrial Solvents and Chemicals <ul style="list-style-type: none"> • Solvent extraction and purification processes • Production of industrial chemicals (e.g., acids, bases, solvents) • Applications of industrial solvents and chemicals in various industries Energy Production and Chemical Engineering <ul style="list-style-type: none"> • Chemical processes in energy production (e.g., petroleum refining, natural gas processing) • Renewable energy technologies and their chemical aspects • Environmental impacts and sustainability considerations | |
| Recommended Textbooks: <ul style="list-style-type: none"> • "Introduction to Industrial Chemistry" by C.A. Heaton • "Chemical Process Industries" by Shreve and Brink • "Chemical Engineering Design" by Gavin Towler and Ray Sinnott | |


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