STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600 086

General Elective Course Offered by Department of Chemistry for B A. / B.Sc. / B.Com.

B.S.W. / B.V.A Degree Programmes

SYLLABUS

(Effective from the academic year 2015 - 2016)

BASIC NUTRITIONAL CHEMISTRY

CODE: 15CH/GE/BN23 **CREDITS: 3**

L T P: 3 0 0

TOTAL TEACHING HOURS: 39

OBJECTIVE OF THE COURSE

To educate students on the fundamental aspects of nutrition and its importance for a healthy living.

Unit 1

Nutrition and Health (8 hrs.)

1.1 Definition- Nutrition, Health and Disease; Nutrients – Macronutrients - Carbohydrate, Protein, Fat, Water- Micronutrients - Vitamins and Minerals

1.2 Under Nutrition, Over Nutrition, and Malnutrition; Diet Recommendations for Optimal Health

1.3 Daily Reference Intakes- Estimated Average Requirements (EAR), Recommended Dietary Allowances (RDA), Adequate Intakes (AI), Tolerable Upper Intake Levels (UL**)**

1.4 Mandatory and Optional Inclusions on Nutrition Labels, Claims on Labels, Allergy Warnings

Unit 2

Nutrient and Human Body (5 hrs.)

2.1 Cell, Tissues, Organs, Organ Systems, and Organisms, Nutrient and Energy Flow

2.2 Digestion and Absorption of Food

Unit 3

Indicators of Health (6 hrs.)

3.1 Body Mass Index [BMI] – Calculation, Limitations; Body Fat and its Distribution

3.2 Energy Balance, Factors Affecting Energy Intake- Physiology, Genetic Influences, Societal Influences

3.3 Health Risk – Obesity, Underweight-Anorexia Nervosa, Bulimia, Binge-Eating Disorder

3.4 Recommendations for Weight Management -Dietary, Behavioral, and Physical Activity

Unit 4

Nutrition through Life **(10 hrs.)**

4.1 Pregnancy to the Toddler Years
4.2 From Childhood to the Elderly Years
4.3 Dietary Food Trends- Functional Foods, Conventional Foods, Modified Foods and Medical Foods
4.4 Popular Diets- GM Diet, DASH Diet, Gluten-Free Diet, Low-Carb Diets, The Macrobiotic Diet, the Mediterranean Diet, Vegetarian and Vegan Diets

Unit 5

Food and Diseases **(10 hrs.)**

5.1 Benefits of Physical Activity, Mental and Emotional Benefits
5.2 Anaemia, Hypertension, Cardiovascular Disease, Cancer, Diabetes and their Prevention
5.3 Causes of Food Contamination – Bacteria, Virus, Parasitic Protozoa, Mold Toxins, Poisonous Mushrooms, Pesticides, Pollutants

TEXT BOOKS

Maureen Zimmerman and Beth Snow. *An introduction to Nutrition*. Creative Commons, 2012.

Srilakshmi, B. *Nutrition Science*. New Delhi: New Age International, 2014.

Swaminathan, M. *Textbook on Food Chemistry*. Bangalore: Printing and Publishing, 2006.

BOOKS FOR REFERENCE

William Hogoland Mayer. *Food Chemistry*. New Delhi: CBS Publishers and Distributors, 2002

Owen R. Fennema. *Food Chemistry***.** New York: Marcel Decker Inc, 2000.

WEB RESOURCES

http://videos.howstuffworks.com/discovery-health/36937-bob-greene-manon-the-streets-nutrition-quiz-video.htm

http://www.who.int/dietphysicalactivity/publications/trs916/summary/en/

PATTERN OF EVALUATION

No End Semester Examination.

Continuous Assessment:
Total Marks: 50 **Duration: 90 mins.**
Section A – 15 x 1 = 15 Marks (All questions to be answered) Multiple choice - 5, Fill in the Blanks - 5, T/F or Match the following or single line answer - 5
Section B – 3 x 5 = 15 Marks (3 out of 5 to be answered)
Section C – 2 x 10 = 20 Marks (2 out of 3 to be answered)

Third Component:
List of evaluation modes:
Seminars
Quiz
Open Book Tests
Assignments
MCQ
Short Answer Tests

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SYLLABUS
(Effective from the academic year 2015 – 2016)

CHEMISTRY IN EVERYDAY LIFE

CODE: 15CH/GE/CE23 **CREDITS: 3**
L T P: 3 0 0
TOTAL TEACHING HOURS: 39

OBJECTIVE OF THE COURSE

- To understand applications of Chemistry in everyday life

Unit 1

Food Additives **(7 hrs.)**

1.1 Food Colours - Permitted and Non Permitted, Artificial Sweetners – Aspartame, Saccharin and Cyclamate, Preservatives - Natural and Synthetic, Flavours – Mono Sodium Glutamate. Stabilising and Suspending Agents - Gelatin, Pectin. Toxic Effects of Food Additives

Unit 2

Pharmaceuticals **(8 hrs.)**

2.1 Antimalarials, Antipyretics, Analgesics, Antiseptics, Antibiotics-Antacids, Antihistamines, Chemotherapy –Definition and Therapeutic Uses. Diabetes-Types and Causes

2.2 Nutraceuticals – Vitamins - Water and Fat Soluble, Minerals and Trace Elements, Antioxidants. Role of Nutraceuticals in Disease Prevention-Diabetes and Cancer

Unit 3

Cosmetics **(8 hrs.)**

3.1 Shampoo, Hair Dyes, Skin Products – Creams and Lotions, Lipstick, Perfume – General Formulation

3.2 Deodorants and Antiperspirants

3.3 Toxicology of Cosmetics

Unit 4

Polymers and Dyes **(8 hrs.)**

4.1 Classification and applications of polymer, Natural- rubber, cellulose, rayon and leather. Synthetic – Bakelite, polyester, nylon and polypropylene

4.2 Environmental hazards of polymers

4.3 Different types of plastics, recycling of plastics

4.4 Types of paper- environmental impact of paper, applications of paper- thickness, weight and size of paper

4.5 Classification of dyes -natural (indigo, alizarin) and synthetic (azo and triphenylmethane) dyes

Unit 5

Soaps and Detergents **(8 hrs.)**

5.1 Soaps –Types, Composition and Cleansing Action of Soap

5.2 Detergents –Classification, Detergent Action, Enzymes used in Commercial Detergents. Biodegradable Detergents. Detergents and Environment

TEXT BOOK

Gem Mathew G.D. *Chemistry in Everyday Life*. Jalandhar-Delhi: Vishal, 2009

BOOKS FOR REFERENCE

Chakrabarty, B.N. *Industrial Chemistry*. New Delhi: Shiv Narain, 2002.

Sharma B. K. *Industrial Chemistry*. Meerut: GOEL Publishing House, 2000.

WEB RESOURCES

http://chemistry.about.com/od/everydaychemistry/
http://dwb4.unl.edu/Chem/CHEM869A/CHEM869ALinks/www.sdahq.org/sdalatest/html/soapchemistry1.htm

PATTERN OF EVALUATION

No End Semester Examination.

Continuous Assessment:
Total Marks: 50 **Duration: 90 mins.**

Section A – 15 x 1 = 15 Marks (All questions to be answered) Multiple choice - 5, Fill in the Blanks - 5, T/F or Match the following or single line answer - 5

Section B – 3 x 5 = 15 Marks (3 out of 5 to be answered)

Section C – 2 x 10 = 20 Marks (2 out of 3 to be answered)

Third Component:
List of evaluation modes:

Seminars
Quiz
Open Book Tests
Assignments
MCQ
Short Answer Tests

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SYLLABUS
(Effective from the academic year 2015- 2016)

COSMETICS AND PERSONAL CARE

CODE: 15CH/GE/CP22 **CREDITS: 2**
L T P: 2 0 0
TOTAL TEACHING HOURS: 26

OBJECTIVES OF THE COURSE

- To introduce the concept of cosmetology
- To understand the importance of personal care

Unit 1
Skin Care (8 hrs.)

1.1 Skin- Structure and Functions- pH and Moisture Balance, Maintenance of Skin

1.2 Types of Skin: Dry Skin, Oily Skin, Wrinkle Skin

1.3 Cleansing of the Skin, Creams and Lotions, Astringent and Skin Tonics, Skin Lighteners, Depilatories, Food Habits Related to Skin Care

Unit 2
Scalp and Hair Treatments (8 hrs.)

2.1 Structure of Hair, Growth and Type of Hair

2.2 Shampoos and Conditioners, Hair Styling Products, Hair Ironing and Methods of Colouring/Dyeing- Precautionary Measures

2.3 Personal Care and Cleanliness of Hair

Unit 3
Beauty Treatments (10 hrs.)

3.1 Facials-Types-Advantages and Disadvantages

3.2 Lipstick, Eyeliner, Mascara, Eye Shadow - Chemical Composition

3.3 AHA Exfoliation, Facial Galvanic, High Frequency, Aroma Therapy

3.4 Toxicology of Cosmetics

3.5 Demonstration by Experts in the Field of Cosmetology

TEXT BOOKS

Gem Mathew, G.D. *Chemistry in Everyday Life*. Vishal, 2014

Wilkinson J B E and Moore R J. *Harry's Cosmetology*. London: Chemical Publishers, 2000.

WEB RESOURCES

http://www.abpischools.org.uk/page/modules/skin/.cfm?coSiteNavigation_allTopic=1
http://health.howstuffworks.com/skin-care/nail-care
http://www.chemistryviews.org/details/ezine/4007741/Shampoo_Science.html
http://www.webhealthcentre.com/HealthyLiving/personal_hygiene_index.aspx

PATTERN OF EVALUATION (Totally Internal)

Total marks: 25 **Duration: 90 mins.**

No End Semester Examination

Continuous Assessment:
Section A 5 x 1 =5 marks (All questions to be answered)
Section B 2 x 5 =10 marks (2 out of 3 to be answered)
Section C 1 x 10 = 10 marks (1 out of 2 to be answered)

Third Component: 25 marks
List of Evaluation modes:
Seminars
Quiz
Assignments

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600 086

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SYLLABUS

(Effective from the academic year 2015- 2016)

FOOD QUALITY AND DETECTION OF FOOD ADULTERATION

CODE: 15CH/GE/FA23 **CREDITS : 3**

L T P: 2 0 1

TOTAL TEACHING HOURS: 39

OBJECTIVES OF THE COURSE

- To study common food adulterants and their health hazards
- To Learn methods of detecting food adulteration
- To provide an understanding of the legislative aspects and the role and functions of regulatory agencies in India

Unit 1

Quality Control (5 hrs.)

1.1 Quality Control and its importance, Quality Assurance

1.2 Food Laws: Prevention of Food Adulteration Act, BIS Act, FPO Act, Essential Commodities Act, Consumer Protection Act, Agricultural Produce Act (AGMARK), FSSAI, Drug License and WHO Standards

1.3 Salient Features of P.F.A., Misbranded Food, Brief Outline of Labeling Provisions Under P.F.A

1.4 Role and Functions of Implementing Agencies with references to Indian Scenario

1.5 Tips to Consumers for Buying Safety Food

Unit 2

Food Adulteration and Food Toxins (8 hrs.)

2.1 Definition of Food Adulteration, Adulterants in various Food Commodities, Health Hazards of Adulterants and Contaminants

2.2 Adulteration in Fruits, Vegetables, Meat and Dairy Products

2.3 Detection of Adulteration in Coffee, Tea, Milk, Oil, Food Grains, Dhals, Sugar, Ghee, Supari, Turmeric Powder, Kesari Powder, Chilli Powder, Spices, Jaggery, Sweets, Jam, Jelly, Honey - Laboratory Tests Only

2.4 Food Toxins- Natural Toxins, Environmental Toxins-Pesticides and Heavy Metal Contamination in Foods

Unit 3

Food Additives (5 hrs.)

3.1 Artificial Sweeteners – Saccharin, Cyclamate, Aspartame, Food Flavours – MSG, Esters, Aldehydes and Heterocyclic Compounds, Antioxidants, Food Colours – Permitted and Non Permitted Colours, Emulsifying Agents, Preservatives, Leavening Agents- Baking Powder and Yeast

Unit 4

Assessment of Food Quality - Sensory Evaluation (8 hrs.)

4.1 Sensory Characteristics of Food, Factors affecting Food Acceptance - Sensory and Psychological

4.2 Requirements for conducting Sensory Tests - Trained Panel Members, Testing Area, Sample Preparation and Presentation, Testing Time, Temperature, Design of the Experiment

4.3 Types of Tests - Difference Tests, Paired Difference Tests, Duo-Trio Test, Triangle Test, Rating Test – Ranking and Hedonic Rating Test, Numerical Scoring Test. Sensitivity Tests - Threshold Test and Dilution Test; Descriptive Tests – Flavour Profile

4.4 Objective Method of Sensory Evaluation – Chemical, Physico - Chemical, Physical Methods and Microscopic Examination

Unit 5 (13 hrs.)

Practicals (to be tested internally)

5.1 Assessment of Food Quality - Sensory Evaluation: Threshold Test, Dilution Test - Colour Comparison, Scoring Test, Difference Test – Paired Difference Test, Duo-Trio Test, Triangle Test. Rating Test – Hedonic, Numerical Scoring Test, Descriptive Test – Flavour Profile

5.2 Detection of Adulterants: Chicory and Tamarind Seed Powder in Coffee Powder, Non Permitted Colours in Tea and Dhal, Metanil Yellow in Turmeric Powder, Kesari Dhal and Thoor Dhal, Castor Oil in Coconut Oil, Papaya Seeds and Rotten Pepper in Pepper, Brick Powder in Chilli Powder, Washing Soda in Jaggery, Vanaspathi in Ghee, Chalk Powder in Salt and Sugar, Non Permitted Colours in Jams, Jelly, Juices and Saccharin in Supari

TEXT BOOK

Swaminathan Geetha and Mary George. *Laboratory Chemical Methods in Food Analysis*. Chennai: Margham, 2010.

REFERENCE BOOKS

Lilian Hoagland Meyer. *Food Chemistry.* CBS Publishers & Distributors, 2004.

Mudambi, R, Sumathi and Raja Gopal, M.V. *Fundamentals of Foods and Nutrition*. India: Wiley Eastern, 2004.

Sri Lakshmi, B. *Food Science.* New Age International, 2005.

Swaminathan, M. *Handbook of Food and Nutrition.* Bangalore: Bangalore Printing and Pub, 2001.

WEB RESOURCES

http://agmarknet.nic.in/adulterants.htm
http://www.fssai.gov.in/
http://www.foodafactoflife.org.uk/sheet.aspx?siteId=19&sectionId=83&contentId=308

PATTERN OF EVALUATION

No End Semester Examination

Continuous Assessment:
Total Marks: 50 **Duration: 90 mins.**
Section A – 15 x 1 = 15 Marks (All questions to be answered) Multiple choice - 5, Fill in the blank up - 5, T/F or Match the following or single line answer - 5
Section B – 3 x 5 = 15 Marks (3 out of 5 to be answered)
Section C – 2 x 10 = 20 Marks (2 out of 3 to be answered)

Third Component:
List of evaluation modes:
Seminars
Quiz
Open Book Tests
Assignments
MCQ
Short Answer Tests

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SYLLABUS
(Effective from the academic year 2015 - 2016)

FORENSIC CHEMISTRY

CODE: 15CH/GE/FC23 **CREDITS: 3**
L T P: 3 0 0
TOTAL TEACHING HOURS: 39

OBJECTIVES OF THE COURSE

- To introduce the fundamentals concepts of Forensic Chemistry
- To encourage the students to work in the field of Forensic Chemistry

Unit 1

Introduction to Criminalistics **(8 hrs.)**

1.1 Investigating the Crime Scene - Documenting the Scene and the Evidence, Recognition of Physical Evidence Collection, Preservation, Inventory, and Transportation of Physical Evidence

1.2 Investigating and Processing Physical Evidence- Types of Evidence, the Modern Crime Lab, Functions of a Forensic Scientist, Characteristics of Physical Evidence

Unit 2

Trace and Pattern Evidence **(10 hrs.)**

2.1 Physical Properties - Forensic Characterization of Soil

2.2 Forensic Identification of Hair, Fibers and Paint

2.3 Forensic Analysis of Glass

2.4 Fingerprints - Characteristics of Fingerprints, Methods for Developing Fingerprints, Preservation of Fingerprints, Handwriting, Typed and Word-Processed Documents, Photocopied Documents

Unit 3 **(8hrs.)**

Chemical and Biological Evidence

3.1 Forensic Methods for Determination of Metals and Gunshot Residue, Techniques for the Analysis of Inorganic Materials, Drugs of Abuse

3.2 Forensic Toxicology- Measurement of Blood, Alcohol Breath Test for Alcohol

3.3 Biological Fluids - Blood, Semen, Saliva. Forensic DNA Typing

Unit 4

Fire-Arson and Explosives **(8 hrs.)**

4.1 Firearms - Ammunition, Ballistics, Laboratory Examination of Firearm Evidence

4.2 Arson - Evidence from Fire affected Area – Combustible Burning Characteristics – Nature of Combustion

4.3 Explosives – Classification, Evidence from the Scene of Explosion to detect the Cause of Explosion

Unit 5

Cybercrime **(5 hrs.)**

5.1 Cybercrime and Laws – Introduction to IT Laws

5.2 Cybercrimes – Internet, Hacking, Viruses, Virus Attacks, Software Piracy, Intellectual Property, Legal System of Information Technology, Mail Bombs, Bug Exploits and Cyber Security

TEXT BOOKS

Bapuly, A.K. *Forensic Science – Its Applications in Crime Investigation*. Hyderabad: Paramedical Publisher, 2006.

Sharma B.R. *Forensic Science in Criminal Investigation and Trials*. New Delhi: Universal law publication, 2006.

BOOKS FOR REFERENCE

Henry C. Lee, Timothy Palmbach and Marilyn C.Miller. *Henry Lee's Crime Scene Hand book.* Amsterdam: Elsevier Academic Press, 2001.

Russel Max M Houck and Jay A Siegel. *Fundamentals of Forensic Science***.** Amsterdam: Elsevier Academic Press, 2006.

WEB RESOURCES

http://www.remondini.net/newsite/?q=system/files/forensic%20chemistry_0.pdf
http://www.legalindia.in/cyber-crimes-and-the-law/

PATTERN OF EVALUATION

No End Semester Examination.

Continuous Assessment:

Total Marks: 50 **Duration: 90 mins.**

Section A – 15 x 1 = 15 Marks (All questions to be answered) Multiple choice - 5, Fill in the Blanks - 5, T/F or Match the following or single line answer - 5

Section B – 3 x 5 = 15 Marks (3 out of 5 to be answered)

Section C – 2 x 10 = 20 Marks (2 out of 3 to be answered)

Third Component:

List of evaluation modes:

Seminars
Quiz
Open Book Tests
Assignments
MCQ
Short Answer Tests

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B.Sc DEGREE: BRANCH IV- CHEMISTRY

General Elective Course Offered by Department of Chemistry for B A. / B.Sc. / B.Com./B.S.W. / B.V.A Degree Programmes

SYLLABUS

(Effective from the academic year 2015-2016)

NUTRACEUTICALS AND HEALTH CARE

CODE: 15CH/GE/NH22 **CREDITS : 2**

L T P : 2 0 0

TOTAL TEACHING HOURS : 26

OBJECTIVES OF THE COURSE

- To provide an understanding of Food Science and Human Nutrition
- To develop functional foods for market

Unit 1

Introduction (8 hrs.)

1.1 Definition and Classification of Nutraceuticals

1.2 Relationship between Nutraceuticals, Food and Medicine

1.3 Prebiotics: Definition, Sources, Bioavailability, Effects on Human Health and Applications-Non-Digestible (Carbohydrates/Oligosaccharides), Dietary Fibre and Resistant Starch

. 1.4 Probiotics: Probiotic Microorganisms, Foods - Fermented Milk Products, Non-Milk Products, Quality Assurance of Probiotics and Safety

Unit 2

Phytonutrients (10 hrs.)

2.1 Role of Isoprenoids, Flavonoids, Carotenoids and Polyunsaturated Fatty Acids.

2.2 Functional Foods – Vegetables, Cereals, Milk and Dairy Products

2.3 Nutraceutical Rich Supplements – Caffeine, Green Tea, Mushroom Extract, Chlorophyll and Spirulina

2.4 Nutraceutical Remedies – Bronchitis, Circulatory Problems, Hypoglycemia, Nephrological Disorders, Liver Disorders, Psoriasis and Ulcers

Unit 3

Diet Therapy and Health Care (8 hrs.)

3.1 Basic Concepts of Diet Therapy –Principles and Classification of Therapeutic Diets

3.2 Nutritional Care for Weight Management –Etiological Factors Contributing to Obesity, Low Energy Diets, Balanced Energy Reduction and Behavioral Modification. underweight – Etiology and Assessment, High Energy Diets For Weight Gain

TEXT BOOK

Robert E.C. Wildman, Robert Wildman, Taylor C. Wallace. *Handbook of Nutraceuticals and Functional Foods*. Boca Raton: CRC, 2012.

BOOK FOR REFERENCE

Aluko, Rotimi E. *Functional Foods and Nutraceuticals.* Boca Raton: CRC, 2012.

WEB RESOURCES

http://www.ijppsjournal.com/Vol2Issue3/599.pdf
http://www.ajpcr.com/Vol3Issue1/265.pdf
http://sphinxsai.com/Vol.3No.1/pharm_jan-mar11/pdf/JM11%28PT=74%29%20pp%20442-448.pdf

PATTERN OF EVALUATION (Totally Internal)

Total marks: 25 **Duration: 90 mins.**

No End Semester Examination

Continuous Assessment:
Section A 5 x 1 =5 marks (All questions to be answered)
Section B 2 x 5 =10 marks (2 out of 3 to be answered)
Section C 1 x 10 = 10 marks (1 out of 2 to be answered)

Third Component: 25 marks
List of Evaluation modes:
Seminars
Quiz
Assignments