THE COLLEGE OF THE BAHAMAS

COURSE PROPOSAL FORM

COURSE ABBREVIATION & NUMBER

C	H	E	M		1	0	0

SCHOOL: SCIENCES AND TECHNOLOGY

DEPARTMENT: CHEMISTRY

COURSE TITLE: CHEMISTRY IN THE WORLD AROUND US

COURSE DESCRIPTION FOR CATALOGUE (50 WORDS MAXIMUM):
In this course for non-science majors, focus is on modern applications of chemistry that demonstrate personal, local and global connections with the discipline.

PURPOSE OF COURSE:

University Transfer	(X)	External Examination	( )
College Diploma or Certificate	( )	Upgrading	( )
College Degree	(X)		

PRE-REQUISITE(S): First-year standing or permission of Chair/Instructor

CO-REQUISITE(S): NONE

HOURS PER WEEK: Lecture 3 Laboratory __ Seminar __ Tutorial ___ Other ___

LAB/TUTORIAL FEE: NONE

SEMESTER HOUR CREDITS: 3

SEQUENTIAL COURSE(S): NONE

OTHER COB COURSES HAVING CONTENT OVERLAP: NONE

COURSE DEVELOPED ( )/REVISED (X) BY:
(1) GLEN HOLDEN Date: October 2004
(2) _____ Date: _____

APPROVALS:
Head of Department: _____ Date: _____

Chair of School:_____ Date:_____

Dean: _____ Date: _____

Academic Board:_____ Date: _____

NOTE:
1. A detailed course description must be attached. This must include course objectives, list of topics covered, prescribed textbooks, reading list, method of assessment and external examinations which are prepared for in this course.
2. The course description must be suitable for distribution to students.
3. Only lecturers/instructors approved by The College will be allowed to teach this course.

THE COLLEGE OF THE BAHAMAS
SCHOOL OF SCIENCES AND TECHNOLOGY
DEPARTMENT OF CHEMISTRY

CHEM 100 – CHEMISTRY IN THE WORLD AROUND US
3 semester hour credits

COURSE DESCRIPTION

In this course for non-science majors, focus is on modern applications of chemistry that demonstrate personal, local and global connections with the discipline.

SPECIFIC OBJECTIVES

Upon successful completion of this course, students will be able to

1. illustrate chemical principles using topics of current interest;
2. apply chemical principles to everyday life;
3. read about science and technology with some degree of critical judgment;
4. discuss the effects of human activities on the environment; and
5. discuss local and global energy issues.

COURSE CONTENT

Divided into required content and elective content.

The required content
1) an overview
2) air
3) energy use and supply

The elective content consists of one of six units
1) chemistry of food
2) household chemicals
3) water
4) polymers
5) chemicals cures, comforts and cautions
6) chemicals toxicology

<u>REQUIRED CONTENT</u>

1) AN OVERVIEW
   - i) The central role of chemistry
   - ii) Chemistry as an experimental science
     - a) Hypotheses and laws
     - b) Theories and models
   - iii) Science and technology: risks and benefits
   - iv) Guide to critical thinking
     - a) Falsifiability
     - b) Logic
     - c) Reproducibility
     - d) Sufficiency
   - v) Classifications
     - a) Matter
     - b) Atoms
     - c) Molecules
     - d) Elements (the periodic table)
     - e) Compounds
   - vi) Physical and chemical changes
   - vii) Physical and chemical properties

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2) AIR
- i) Composition
- ii) Earth's atmospheric divisions and composition
- iii) Pressure and temperature changes with altitude
- iv) Electromagnetic spectrum
  - a) Visible
  - b) Infrared
  - c) Ultraviolet
- v) Greenhouse effect and gases
- vi) Global warming: causes and effects
- vii) Main pollutants and their sources
  - a) Industrial and photochemical smog
  - b) Natural sources
- viii) Ozone
  - a) Ozone depleting substances (ODS)
  - b) Consequences of declining levels
  - c) Global response to ozone problem
- ix) Acid rain
  - a) pH of normal rainfall
  - b) Anthropogenic effects
  - c) Problems
- x) Critical thinking on environmental issues
  - a) Montreal protocol
  - b) Kyoto protocol

3) ENERGY USE AND SUPPLY
- i) Law of conservation of energy
- ii) Transforming energy for power
- iii) Properties of good fuel
- iv) Fossil fuels
  - a) Coal
  - b) Oil
  - c) Natural gas
- v) Seeking substitutes
  - a) Synthetic gasolines
  - b) Biomass
  - c) Splitting water with 'rubippy'
- vi) Alternate energy sources
  - a) Solar
  - b) Water
  - c) Wind
  - d) Fuel cells and batteries
  - e) Nuclear
- vii) Critical thinking on energy issues
  - a) Energy costs of tourism in The Bahamas
  - b) Energy management in The Bahamas

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ELECTIVE CONTENT: ANY ONE UNIT OF SIX

1) CHEMISTRY OF FOOD
- i) Energy released by chemical reactions
  - a) Food calories (the kilocalorie and kilojoule)
  - b) Energy per gram in fats, carbohydrates and proteins
  - c) Simple energy calculations
- ii) Food additives
  - a) Additives that improve nutrition
  - b) Artificial sweeteners
  - c) Flavor enhancers
  - d) Spoilage inhibitors
  - e) Antioxidants
  - f) Food colors
- iii) Poisons in food
- iv) Critical thinking on population growth and food supply

2) HOUSEHOLD CHEMICALS
- i) Soap
- ii) Syndets
  - a) Alkyl benzene sulphonate detergents
  - b) Lauryl alkyl sulphonate detergents
- iii) Laundry and dishwashing detergents formulations
- iv) Special purpose cleaners: toilet bowl cleaners, bleach, ammonia, scouring powders, glass cleaners, drain cleaners and oven cleaners
- v) Organic solvents, paints and waxes
- vi) Cosmetics
- vii) Toothpaste
- viii) Perfumes, colognes and aftershaves
- ix) Shampoo, hair coloring, “perm”, hair sprays, hair removers, hair restorers
- vii) Critical thinking on what to buy and use

3) WATER
- i) Daily consumption
- ii) Unusual properties
- iii) Pressure dependence of boiling point
- iv) Freeze-drying process
- v) Flash-frozen foods
- vi) Carbonated drinks
- vii) Scuba diving
  - a) Qualitative statement of Boyle’s Law
  - b) Physiological effects of water pressure
    1. “martini’s law”
    2. nitrogen saturation
    3. decompression
- viii) Salinity of the ocean
- ix) Biological, chemical and industrial pollution
- x) Potability and purification
- xi) Hard and soft water
- xii) Ion exchange with xeolites
- xiii) Distillation and desalination
- xiv) Critical thinking on water issues

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4) POLYMERS
- i) Polymeriztion
- ii) Natural polymers
- iii) Properties
- iv) Types
  - a) High-density polyethylene
  - b) Low-density polyethylene
  - c) Polystyrene
  - d) Polypropylene
  - e) Polyvinyl chloride
  - f) Polyethylene terephthalate
- v) Critical thinking on Plastics
  - a) Plastic versus paper
  - b) Plastics of the future

5) CHEMICAL CURES, COMFORTS AND CAUTIONS
- i) Pain relievers
- ii) Antibacterial drugs
- iii) Antiviral drugs
- iv) Anticancer drugs
- v) Hormones and steroids
- vi) Contraceptives
- vii) Psycotropic drugs
  - a) Stimulants
  - b) Depressants
  - c) Hallucinogens
- viii) Efficacy
  - a) LD_{50} test
  - b) Placebo effect
- x) Critical thinking on drug use and legal problems

6) CHEMICAL TOXICOLOGY
- i) Identifying poisons
- ii) Types
  - a) Corrosive poisons
  - b) Poisons affecting oxygen transport
  - c) Heavy metal poisons
  - d) Nerve poisons
  - e) Organ phosphorus compounds
  - f) Chemical carcinogens
- iii) Teratogens
- iv) Hazardous wastes
- v) Critical thinking on the risks and benefits of poisons

ASSESSMENT

Case scenarios	20%
Presentations	40%
Assignments	20%
Class tests	20%
Total	100%

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REQUIRED TEXT

Hill, J. W., & Kolb, D. K. (2001). *Chemistry for changing times* (9th ed.). Upper Saddle River, NJ 07458: Prentice-Hall Inc. ISBN 0-13-087489-2

SUPPLEMENTARY READINGS

Selinger, B. K**.** (1998). *Chemistry in the market place* (5th ed.). Florida: Harcourt Brace & Company. ISBN 0-72953300X

Journals
Chemistry and Industry
Consumer Reports
Food Chemistry
Green Chemistry
* Journal of Chemical Education
*Journal of Environmental Quality
* Journal of Environmental Sciences (Ebscohost: Full text)
* Journal of Food Science. 1997: Microfilm
Journal of Polymers and the Environment
* Nature
* Scientific American
* Science Teacher

Website
http://www.prenhall.com/hillkolb

* Available in COB Library