THE COLLEGE OF THE BAHAMAS

COURSE PROPOSAL FORM

COURSE ABBREVIATION & NUMBER

C	H	E	M		4	3	6

SCHOOL: NATURAL SCIENCES AND ENVIRONMENTAL STUDIES

DEPARTMENT: CHEMISTRY

COURSE TITLE: PRINCIPLES OF BIOCHEMISTRY II

COURSE DESCRIPTION FOR CATALOGUE (50 WORDS MAXIMUM):
This course focuses on the effects of metabolic defects arising from genetic and environmental factors. Students will analyse clinical-chemical assessments of selected health related conditions.

PURPOSE OF COURSE:

University Transfer	(X)	External Examination	( )
College Diploma or Certificate	( )	Recreational/General Interest (non-credit)	( )
College Degree	(X)	Professional Development	(X)
Upgrading	( )		

PRE-REQUISITE(S): CHEM 336 and BIOL 200 or permission of Instructor/Chair

CO-REQUISITE(S): NONE

HOURS PER WEEK: Lecture 4 Laboratory___ Seminar____ Tutorial____ Other ____

LAB FEE: NONE

SEMESTER HOUR CREDITS: 4

SEQUENTIAL COURSE(S): NONE

OTHER COB COURSES HAVING CONTENT OVERLAP: NONE

COURSE DEVELOPED (X)/REVISED ( ) BY:
(1) BRIDGET HOGG Date: March 2004
(2) _____ Date: _____

APPROVALS:
Chair of School:_____ Date:_____
Head of Department: _____ 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 NATURAL SCIENCES AND ENVIRONMENTAL STUDIES
DEPARTMENT OF CHEMISTRY

CHEM 436 – PRINCIPLES OF BIOCHEMISTRY II

4 Semester Hour Credits

COURSE DESCRIPTION

This course focuses on the effects of metabolic defects arising from genetic and environmental factors. Students will analyse clinical-chemical assessments of selected health related conditions.

SPECIFIC OBJECTIVES

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

1 evaluate the role of genetic and environmental factors associated with the development of selected metabolic defects in carbohydrate, lipid and protein metabolism, including Diabetes, Glycogen Storage Disease, Gaucher's Disease and Phenylketonuria;
2 analyse the essential components of whole human blood and their functions;
3 assess the application of clinical-chemical tests in the detection of metabolic disorders such as Diabetes, Glycogen Storage Disease, Gaucher's Disease and Phenylketonuria.;
4 interpret clinical tests and the relationship between disease and metabolism;
5 compare and contrast metabolic functions in healthy and diseased individuals; and
6 evaluate the impact of selected metabolic disorders such as Diabetes, Glycogen Storage Disease, Gaucher's Disease and Phenylketonuria on society.

COURSE CONTENT

1 Blood Chemistry
- a. Composition of blood and function of blood components
  - i. Cells – Red blood cells, white blood cells
  - ii. Plasma – Inorganic components, nonprotein metabolites, transport proteins
- b. Metabolic processes in red blood cells
  - i. Glycolysis
  - ii. Pentose phosphate pathway
- c. Clinical Indicators in blood
  - i. Haemoglobin status
  - ii. Red cell count
  - iii. White cell count
  - iv. Enzyme activity, e.g., Alkaline phosphatase

2 Inborn Errors of Metabolism
- a. Carbohydrate Metabolism Errors
  - i. Types of disorders, e.g., Diabetes, Glycogen Storage Disease
  - ii. Causes of disorders
  - iii. Symptoms - biochemical and systemic
  - iv. Clinical tests for disorders
- b. Lipid Metabolism Errors
  - i. Types of disorders, e.g., Gaucher's Disease, Fabrays Disease
  - ii. Causes of disorders
  - iii. Symptoms – biochemical and systemic
  - iv. Clinical tests for disorders

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c. Protein and Nucleic Acid Metabolism Errors
   i. Types of disorders, e.g., Homocystinuria, Phenylketonuria
   ii. Causes of disorders
   iii. Symptoms - biochemical and systemic
   iv. Clinical tests for disorders

3. Diet Related Conditions
a. Vitamin Deficiency Conditions
   i. Types of disorders, e.g., Pellagra, Ricketts
   ii. Causes of disorders
   iii. Symptoms – biochemical and systemic
   iv. Clinical tests for disorders
b. Protein /Energy Balance conditions
   i. Types of Disorders, e.g., Obesity, Protein Energy Malnutrition
   ii. Causes of disorders
   iii. Symptoms – biochemical and systemic
   iv. Clinical tests for disorders

4. The impact of specific metabolic disorders on society
a. Worker health and performance
b. Public Healthcare

5. Analysis in the clinical laboratory
a. Discussion of laboratory analysis
   i. Theoretical basis for tests
   ii. Test methods
   iii. Normal / reference values for tests
b. Field Trip(s) to clinical laboratories
   i. Blood analysis
   ii. Urinalysis
   iii. Metabolic studies (pre/post meal glucose monitoring)
c. Field Trip(s) to public / private clinic(s)
   i. Typical clinic procedures
   ii. Indicators for clinical testing

ASSESSMENT

Class tests and assignments	30%
Fieldwork & reports	15%
Project	20%
Final examination	35%
TOTAL	100%

REQUIRED TEXT

Garret, R.H., & Grisham, C.M. (2001). *Principles of biochemistry with a human focus*. Canada: Thompson Brooks/Cole Publishing.

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SUPPLEMENTARY READINGS

Boyer, R. (1999). *Concepts in biochemistry*. New York: Thompson Brooks/Cole Publishing.

Campbell, M.K., & Farrell, S.O. (2003). *Biochemistry* (4th ed.). Canada: Thompson Brooks/Cole Publishing.

Stryer, L., & Tomoczko, J. (2002). *Biochemistry* (5th ed.). New York: Worth Publishers.

Journals

**Education in Chemistry: The Royal Society of Chemistry
**Journal of Chemical Education
**Scientific American: Scientific American Inc.

Websites

The most recent and relevant websites can best be accessed through the use of search engines with BIOCHEMISTRY as one of the key words. More specific terms such as the particular chemicals or processes being studied can also be accessed by using their terms as the key word.

**Available at the College of The Bahamas Library