



The University of Southern Queensland

## Course specification

### Description: Biophysical Science Foundations

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
NSC	1951	30419	1, 2004	ONC	1.00	TWMBBA

<b>Academic group:</b>	FOSCI
<b>Academic org:</b>	FOS002
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	019999

### STAFFING

Examiner: Bernadette McCabe

Moderator: Alfio Parisi

### OTHER-REQUISITES

Recommended Co-requisite: NSC1931

### RATIONALE

The purpose of this course is to assist students to understand the chemistry, biochemistry and physics relevant to the functioning of the healthy human body. This course relates to studies in anatomy and physiology, pharmacology, pathophysiology and to nursing practice.

### SYNOPSIS

This course contains the basic chemistry, biochemistry and physics necessary for understanding the functioning of the healthy human body and for nursing practice.

### OBJECTIVES

On successful completion of this course students will be able to:

- demonstrate an understanding of basic chemical concepts with particular reference to chemical processes found within the healthy human body;
- describe the structure and functions of cells and their processes at the molecular level;
- demonstrate a knowledge of the principles of optics and acoustics as related to the eyes and ears;
- utilise an understanding of the scientific basis of therapeutic and diagnostic devices used in health care settings;
- demonstrate competence in theoretical and practical activities designed for nursing science.

## TOPICS

Description	Weighting (%)
1. PHYSICS: The metric system and measurement; Physics of human vision and hearing; Mechanics as related to human function and therapeutic equipment; Electricity and its therapeutic application including safety; Gas laws including pressure, volume and temperature relationships.	30.00
2. CHEMISTRY: Nomenclature; Atomic theory, radiation and its therapeutic applications; Bonding; Chemical quantities, equations, reactions and equilibria; Solutions, Acids, bases and buffers.	35.00
3. BIOCHEMISTRY: Properties of biological molecules - proteins, carbohydrates, nucleic acids and lipids; Enzymes, major metabolic pathways and biosynthetic processes; The cell membrane - diffusion, osmosis, filtration and dialysis	35.00

### TEXT and MATERIALS required to be PURCHASED or ACCESSED:

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

Cree, L & Rischmiller, S 2001, *Science for nursing*, 4th edn, Harcourt Australia, Sydney. (revised)

Douglas, L 2004, *NSC1951 Biophysical Science Foundations Biochemistry Lecture Notes*, University of Southern Queensland, Toowoomba.

McCabe, B & Parisi, A 2004, *NSC1951 Biophysical Science Foundations Instructional Guide*, USQ Publication, Toowoomba.

### REFERENCE MATERIALS:

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Bettelheim, FA, Brown, WH & March, J 2001, *Introduction to general, organic and biochemistry*, 6th edn, Harcourt Brace College, Fort Worth.

Cutnell, JD & Johnson, KW 2001, *Physics*, 5th edn, John Wiley & Sons, New York.

Giancoli, DC 1998, *Physics: principles with applications*, 5th edn, Prentice Hall, New Jersey.

Hewitt, PG, Suchocki, J & Hewitt, LA 1999, *Conceptual physical science*, 2nd edn, Addison Wesley Longman, Menlo Park, CA.

Hickman, R & Caon, M 1995, *Nursing science: Matter & energy in the human body*, 2nd edn, MacMillan Education Australia, Melbourne.

Hinwood, B 1993, *A textbook of science for the health professions*, 2nd edn, Chapman & Hall, London.

Hollins, M 1992, *Medical physics*, Thomas Nelson and Sons Ltd, Surrey.

Holum, JR 1998, *Fundamentals of general organic and biological chemistry*, 6th edn, John Wiley & Sons Inc, New York.

Lankford, TR 1984, *Integrated science for health students*, Reston Publishing Company: Prentice Hall, Reston: Virginia.

Marieb, EN 2004, *Human anatomy and physiology*, 6th edn, Benjamin/Cummings, Menlo Park, CA.

Nave, C & Nave, B 1985, *Physics for the health sciences*, WB Saunders, Philadelphia.

Robards, K & Welch, M 1991, *Science for health professionals*, Harper Educational, Artarmon.

Sackheim, GI & Lehman, DD 1998, *Chemistry for the health sciences*, 8th edn, Prentice Hall, Upper Saddle River, NJ.

Sears, FW, Zemansky MW & Young, HD 1991, *University physics*, 8th edn, Addison Wesley, Reading, Mass.

Stoker, HS 1998, *General, organic and biological chemistry*, Houghton Mifflin Company, Boston.

Strube, P 2003, *Body works: physics and chemistry for nurses*, 2nd edn, Prentice Hall, Sydney.

Timberlake, K 2003, *Chemistry: An introduction to general, organic and biological chemistry*, 8th edn, Benjamin/Cummings, Menlo Park, CA.

## **STUDENT WORKLOAD REQUIREMENTS:**

ACTIVITY	HOURS
Examinations	3.00
Laboratory or Practical Classes	18.00
Lectures	31.00
Private Study	106.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
QUIZZES ON LAB SESSIONS	10.00	10.00	02 Mar 2004 (see note 1)
PARTA 1HR CLOSED TEST- PHYSICS	30.00	25.00	02 Mar 2004 (see note 2)
PARTB 1HR CLOSED TEST- PHYSICS	10.00	5.00	02 Mar 2004 (see note 3)
PARTA 2HR CLOSED EXAM-CHEM&BIO	70.00	45.00	END S1 (see note 4)
PARTB 2HR CLOSED EXAM-CHEM&BIO	20.00	15.00	END S1 (see note 5)

### NOTES:

1. Examiner to advise details regarding quizzes on lab sessions.
2. Examiner to advise details of 1hr closed test (part a)
3. Examiner to advise details of 1hr closed test (part b).
4. Examination dates will be available during the Semester. Please refer to the examination timetable when published. Part ! of 2hr exam - Chem. & Biochem.
5. Examination dates will be available during the Semester. Please refer to the examination timetable when published. Part B exam - Chem & Biochem

## IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:  
It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration. To maximize their chances of satisfying the objectives of the practical component of the course, students should attend and actively participate in the laboratory sessions in the course.
- 2 Requirements for students to complete each assessment item satisfactorily:  
To complete the quizzes, physics examination and biochemistry-chemistry examination satisfactorily, students must obtain at least 50% of the marks available for assessment. Medical certificates and other appropriate documentation for a maximum of two (2) weeks, are taken into consideration when calculating final quiz marks.
- 3 Penalties for late submission of required work:  
Not applicable for this course as there are no assignments.
- 4 Requirements for student to be awarded a passing grade in the course:  
To be assured of receiving a passing grade a student must submit all of the summative assessment items, achieve at least 50% in the examination and at least 50% of the available weighted marks for the summative assessment items.

- 5 Method used to combine assessment results to attain final grade:  
The final grades for students will be assigned on the basis of the weighted aggregate of the marks obtained for each of the summative assessment items in the course.
- 6 Examination information:  
In a Closed Examination, candidates are allowed to bring only writing and drawing instruments into the examination.
- 7 Examination period when Deferred/Supplementary examinations will be held:  
Any Deferred or Supplementary examinations for this course will be held in the fourth week of the semester following this course offering and the examiner will advise students involved in writing of the date time and location of any such examination.
- 8 University Regulations:  
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL <http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

## **ASSESSMENT NOTES**

- 9 Students who do not perform satisfactorily in weekly quizzes or in an examination, may, at the discretion of the Examiner, be granted a supplementary examination. Students will be granted a deferred examination only if they perform satisfactorily in all other assessment items.
- 10 In order to attend laboratory classes, students must provide and wear appropriate personal protective equipment. This shall include a laboratory coat, closed in shoes, and safety glasses. Such equipment must be approved by supervising staff. Failure to provide and wear the appropriate safety equipment will result in students being excluded from classes. Long hair tied back is required for all laboratory sessions.