

**SCHOOL OF CULTURE, COMMUNICATION AND
SOCIETY**

Speech and Language Therapy (BSc Hons)

**BIOLOGICAL SCIENCES FOR SPEECH AND
LANGUAGE THERAPY
SALC07H**

MODULE HANDBOOK

TERMS 2/3 2009

MODULE LEADER: EMILY BURTENSCHAW

BSc Speech and Language Therapy

SALC07H

BIOLOGICAL SCIENCES

Introduction:

This module builds on some of the subject areas already covered in HEAA119 Healthcare Biosciences, addressing selected topics in further detail and in a broader context more directly related to the study of speech and language therapy.

Prior to each session, it would assist the student to refer back to relevant subject areas from HEAA119.

Some sessions will involve a practical element, others will be primarily lecture-based. Two sessions per week have been timetabled; generally only one is directly taught, the other is available for tutorials/seminars and self-directed study activities. Sessions are all day Thursdays; please ensure you check Blackboard/emily for messages relating to any room/time/day changes for this module.

Module Leader:	Emily BURTENSHAW	EB	
Teaching staff:	Dr Andrew Payne	AP	
	Flora Hall	FH	
	Stephen Campbell, Mid-Devon PCT		SC
	Hazel Bending	HB	
	Marianne Bos-Clark	M B-C	

Modes of delivery:

Self-directed learning, lead lectures, workshops, seminars and tutorials.

Learning Outcomes:

As outcomes of this module students should:

1. further develop their understanding of the anatomical structures relevant to speech
2. further their understanding of the development and function of the above structures in relation to the underlying physiological processes
3. be able to apply this knowledge to disorders of speech, language and hearing

Assessment

Examination	2 hour	Biological Sciences for SLT	(100%)
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TIMETABLE

SALC07H Biosciences for SLT 2009

ALL SESSIONS IN ROOM 136 UNLESS OTHERWISE INDICATED

Thursday	Room 136 9.30-12.30am	Room 136 1.30-4.30pm
22/1	Audiology 1 SC	Audiology tutorials: Red group 1.30-3.00, Blue group 3.15-4.45 SC
29/1	Audiology 2 SC	Audiology tutorials Red group 1.30-3.00, Blue group 3.15-4.45 SC
5/2	CV system AP	Vision: self-directed study HB
12/2	Vision: experiential workshop (see MLE for groups, timings and details www.emily.pms.ac.uk) HB	Introductory tutorial: CV system AP
19/2	Respiration AP	Tutorial CV system AP
26/2	Neuro 1 AP	Tutorial respiration AP
5/3	Neuro 2 AP	Tutorial Neuro 1 AP
12/3	Neuro 3 AP	Tutorial Neuro 2 AP
19/3	Neuro 4 AP	Tutorial Neuro 3 AP
26/3	Embryology 1 EB	Tutorial Neuro 4 AP
EASTER BREAK	EASTER BREAK	EASTER BREAK
23/4	Embryology 2 EB	Embryology tutorials NB in Speech Sciences Lab; Red group: 1.30-2.30, Blue group 2.45 –3.45 EB
30/4	Head and Neck 1: the larynx M B-C	Self-directed study
7/5	Head and Neck 2 NB in Speech Sciences lab FH	Self-directed study

14/5	Head and Neck 3 Speech Sciences lab FH	Self-directed study
21/5	Head and Neck 4 Speech Sciences lab FH	Self-directed study
28/5 REVISION WEEK <i>NB attendance at revision tutorials is not compulsory but is advisable</i>	Audiology revision tutorials: Red group 9.30-10.50, Blue group 11.00-12.20 SC	Neurology tutorials: Red group : 1.30-2.30, Blue group 2.45 –3.45 AP
4/6	EXAM WEEK	EXAM WEEK

Re tutorial sessions:

It is very important that you keep to your assigned tutorial groups.

The purpose of a tutorial is to provide an environment whereby students can access more individual help from a tutor, in an atmosphere conducive to asking questions and discussing answers. Having an imbalance of students in any one tutorial group affects the learning opportunities of the whole of that group. In addition, some of the tutorial sessions will require using equipment. If supernumerary students are present, this will impede the opportunities for 'hands on' practice for a number of students in that group.

If you wish to change tutor groups for a valid reason, please arrange a swop with a fellow student and advise your tutor so the attendance register can be amended. Your cooperation is appreciated.

DETAILED PROGRAMME:

Thursday 22nd January 2009:

Morning session

Audiology 1

Stephen Campbell

Aim: To provide an introduction to the perception of hearing, through an introduction to the hearing (or auditory system), the nature of sound and how sound is perceived.

Afternoon session**Audiology Tutorials: Red group 1.30-3.00, Blue group 3.15-4.45****Thursday 29th January 2009:*****Morning session*****Audiology 2**

Stephen Campbell

This lecture concentrates on the physics of sound.

Learning outcomes:

By the end of the 2 lectures and after directed study you should be able to:

- Recall the anatomy & physiology of the hearing system.
- Recognise the nature and production of sound (acoustics).
- Identify how sound is affected by the environment in which we live.
- Identify how sound is perceived by the auditory system.
- Discuss the relationship between the hearing system and other areas of physiology.

Afternoon session**Tutorials: Red group 1.30-3.00, Blue group 3.15-4.45****Audiology References:**

Graham, J and Martin, M (eds) (2001). *Ballantyne's Deafness (6th Edition)*. Whurr. London.

Martin, M and Summers, I. (1999). *Dictionary of Hearing and Acoustics*. Whurr. London.

Physiology references

Refer to any previously recommended physiology texts.

Anatomy and physiology of the ear, including cortical pathways.

Thursday February 5th***Morning session*****Cardiovascular physiology**

Dr Andrew Payne

Revise mechanisms influencing and maintaining blood pressure.

Consideration of the mechanisms influencing fluid exchange between vascular and extravascular spaces in both the systemic and pulmonary circulations. The nature of special circulations with details of the cerebral and coronary circulations. An introduction to atherosclerosis and coronary heart disease.

Learning outcomes:

- Describe and explain the structural organisation of the cardiovascular system.

- Describe and explain the factors and mechanisms influencing fluid exchange in the systemic and pulmonary circulations.
- Explain the mechanisms designed to control blood pressure and the supply of blood to specified regions of the body.
- Provide introductory details of the process of atherosclerosis and the factors influencing the development of coronary heart disease.

Afternoon session:

The eye and vision 1

Hazel Bending and Emily Burtenshaw

The work on vision will include a **self-study package** and a tutor-led **experiential workshop** session. The experiential workshop will be during the morning session of 12th February (next week) and the self-study element this afternoon.

Students will be expected to complete the self study package (which will be posted on Blackboard/MLE) in order to meet the learning outcomes of the sessions.

Learning outcomes:

Following self-directed study and the workshop students will:

- Understand and describe the structures of the eye and the eyeball
- Understand and describe the visual neural pathway
- Understand image formation
- Understand and describe some of the common illness and diseases of the eye and vision.

Reading

You may find the following texts useful.

Tortora, G and Grabowski S (2000) Principles of anatomy and physiology, New York: Harper Collins

Tortora G and Derrickson (2006) Principles of anatomy and physiology 11th edition, New York: Harper Collins

Wilson K and Ross J (1990) Ross and Wilson anatomy and physiology in health and illness, Edinburgh: Churchill Livingstone

Thursday February 12th:

Morning session

Vision experiential workshop

Hazel Bending

Objectives of the experiential workshop:

By the end of the session the students should have:

- ❖ Experienced first hand the impact of a number of vision impairments
- ❖ Had the opportunity to reflect on the practical exercises
- ❖ An understanding of a number of visual impairments.

Afternoon session:**Introductory tutorial.** Identification of cardiovascular issues.**Thursday February 19th****Morning session****The respiratory system**

Dr Andrew Payne

Revise the basic mechanism of ventilation in the lungs, at rest and during exercise. Consideration of the modifications to ventilation which must take place during vocalisation. An introduction to the diseases and conditions which affect the structure of the respiratory system and the integrity of the nervous innervation of respiratory structures. A brief consideration of auscultation and pulmonary function testing.

Learning outcomes:

- Give a detailed account of the mechanism of ventilation of the lungs at rest and during exercise.
- Explain how the pattern of ventilation may be changed in disease.
- Provide introductory details of the diseases and conditions affecting the respiratory system.
- Briefly describe the method and purpose of auscultation and pulmonary function testing.

Afternoon session**MCQ/SWA **formative test** on the cardiovascular system.**

Identification of respiratory issues.

Thursday February 26th 2009**Morning session****Neurology 1**

Dr Andrew Payne

Revise the organisation of the nervous system. Revise the mechanisms of generation and transmission of action potentials and transmission across synapses and neuromuscular junctions. Extend knowledge and understanding of the mechanism of contraction in skeletal muscle and the concept of motor units.

Learning outcomes:

- Give an account of the organisation of the nervous system.
- Explain the response of nervous tissue to stimulation and the mechanism of transmission in neurons, at synapses and across neuromuscular junctions.
- Provide details of the mechanism of contraction in skeletal muscle.
- Explain the concept of the motor unit.

Afternoon session

MCQ/SWA formative test on the respiratory system

Identification of issues in neurology 1

Thursday March 5th 2009

Morning session

Neurology II

Dr Andrew Payne

Revise and extend knowledge and understanding of the structural organisation of the spinal cord and of spinal reflexes affecting skeletal muscle. The structural and functional organisation of the major sensory pathways. An introduction to sensory processing. The structural and functional organisation of the cranial nerves (student directed learning).

Learning outcomes:

- Give an account of the structural organisation of the spinal cord.
- Provide details of specified spinal and cranial reflexes affecting the activity of skeletal muscle.
- Give an account of the structure and functional organisation of the major sensory pathways.
- Provide details of the organisation of the cranial nerves.

Afternoon session

MCQ/SWA formative test on neurology 1

Identification of issues with Neurology 2

Thursday March 12th

Morning session

Neurology III

Dr Andrew Payne

The development and structural organisation of the human brain. The structural and functional organisation of the major cortical and subcortical motor pathways and the control of skeletal muscle with particular emphasis on the head and neck.

Learning outcomes:

- Give an account of the structural organisation of the brain.
- Describe the organisation of the major cortical and subcortical motor pathways and their influence on skeletal muscle activity.

Afternoon session

MCQ/SWA formative test on Neurology 2

Identification of issues with Neurology 3

Thursday March 19th 2009

Morning session

Neurology IV

Dr Andrew Payne

An introduction to the role of the cerebral cortex in the control of movement. Functional inter-relationships between the cerebral cortex, basal ganglia and cerebellum and their roles in motor control. An introduction to stroke and diseases of the basal ganglia and cerebellum.

Learning outcomes:

- Give a brief account of the inter-relationships between the cerebral cortex, basal ganglia and cerebellum and their roles in motor control.
- Give a brief account of diseases and conditions affecting the basal ganglia and cerebellum and their influence on motor control.

Afternoon session

MCQ/SWA *formative test* on Neurology 3

Identification of issues with Neurology 4

Thursday March 26th 2009

Morning session

Embryology 1: Introduction to embryology for SLT - the first 4 weeks.

Emily Burtenshaw

Aim: to re-introduce the basic concepts and principles and revise term 1 content; influences on the growth and development of the embryo; the critical period concept and organogenesis.

Learning outcomes:

By the end of the sessions and after self-directed study, students should:

- Have a general understanding of the different stages of embryonic and foetal development
- Be aware of the genetic and chromosomal influences on development *in utero*
- Understand the role of mutagens and teratogens
- Understand the 'critical period' concept and how this affects development of the embryo and foetus
- Understand how the main iterative processes act in embryonic development
- Have a basic understanding of the processes of fertilisation, implantation, gastrulation and neurulation
- Be aware of the role of neural crest cells in the development of the head and neck structures *in utero*

Reading:

You will find these lectures much easier to follow if you have a look at one of the excellent websites BEFOREHAND! See the reference section at the end of this handbook.

Atkinson, M & McHanwell, S (2002) Basic Medical Science for Speech and Language Therapy Students. London: Whurr Pubs.

Sadler, T W (2005) Langman's Essential Medical Embryology. Baltimore: Lippincott Williams & Wilkins.

This text comes with an interactive CD-rom illustrating the main events in embryological development.

Afternoon session

Neurology tutorial:

Dr Andrew Payne

MCQ/SWA **formative test on Neurology 4**

EASTER BREAK

Thursday April 23rd 2009

Morning session

Embryology 2: Embryological development of the head and neck structures, including the brain

Emily Burtenshaw

Aim: to provide an overview of the formation of the main structures relevant to speech and language development, and to briefly consider some of the anomalies that can arise if these processes go awry.

We will cover development of the eye and ear, the bones of the skull, the development of the pharynx, tongue and palate, and the formation of the face. We will also look briefly at the development of the central nervous system.

Learning outcomes:

By the end of the sessions and after self-directed study, students should:

- have a clear understanding of the embryological origins and development of various head and neck structures
- understand how the skull, eye and ear develop
- be able to describe how the brain and spinal cord develop
- be able to describe how the pharyngeal arches develop and form parts of the structures of the ear, mandible, tongue, pharynx and larynx
- understand and recognise some anomalies that arise in development of the head and neck structures

Reading:

Atkinson, M & McHanwell, S (2002) Basic Medical Science for Speech and Language Therapy Students. London: Whurr Pubs.

Sadler, T W (2005) Langman's Essential Medical Embryology. Baltimore: Lippincott Williams & Wilkins

This text comes with an interactive CD-rom illustrating the main events in embryological development.

Afternoon session:**Embryology directed study tutorials, Speech Sciences Lab**

Emily Burtenshaw

Red group: 1.30-2.30, Blue group 2.45 –3.45**Thursday April 30th 2009*****Morning session*****Head and Neck 1: The Larynx**

Marianne Bos-Clark

Format: Lecture and workshop**Aim:** To provide an introduction to the anatomy and physiology of the larynx.**Learning outcomes:**

By the end of the session and after self-directed study, students should:

- have a clear understanding of the structure and functioning of the larynx
- be able to describe the main cartilaginous structures of the larynx
- be familiar with the intrinsic and extrinsic laryngeal muscle groups
- know how phonation or normal voice is achieved.

For the specific self-study session for this session, you are advised to work through the larynx section on Anatomy TV.

Reading:

Atkinson & McHanwell (2002) Basic Medical Science for SLT students.
London: Whurr. Chapter 16 & 17

Afternoon session:**Self-directed study****Thursday May 7th ,14th and 21st 2009****Head and Neck 2,3,4****Flora Hall**

Format: lecture, directed and self-directed study, and workshops.

NB all 3 of these sessions will be held in the Speech Sciences Lab**Aim:** To provide an overview of the anatomy and physiology of the head and neck area.

Specific areas covered:

- surface anatomy neck of head and neck
- the skull including the mandible

- sinuses
- oral and pharyngeal anatomy including the tongue, velum and palate,
- blood supply to the head and neck
- cranial nerves
- muscles of facial expression and mastication.
- salivation

Learning outcomes:

By the end of these sessions and after self-directed study, students should:

- have a clear understanding of head/neck structures and functions
- be able to identify muscles of the head and neck and
- understand how these muscles function in movement, facial expression, chewing, and swallowing

Reading:

Atkinson & McHanwell (2002) Basic Medical Science for SLT students. London: Whurr. Chapters 16, 17, 18, 19.

Anatomy TV: available on MLE

Please also refer to anatomy/physiology texts and use the internet for further info.

Afternoon sessions

Self-directed study

Thursday May 28th 2009

Morning session

Audiology revision tutorials: Red group 9.30-10.50, Blue group 11.00-12.20

Afternoon session:

Dr

Andrew Payne

Tutorials: general revision on the CV, respiratory systems and neurology

EXAM WEEK COMMENCES JUNE 1ST.

REFERENCES AND READING LIST

Atkinson, M & McHanwell, S (2002) Basic Medical Science for Speech and Language Therapy Students. London: Whurr Pubs.

Love, R J & Web, W G (2001) Neurology for the Speech & Language Pathologist 4th Ed. Butterworth-Heinemann

Sadler, T W (2005) Langman's Essential Medical Embryology. Baltimore: Lippincott Williams & Wilkins

Saladin K with Miller, L (2004) Anatomy and Physiology: The Unity of form and function, 3rd ed. New York: McGraw-Hill.

Seikel, J A, King, D W & Drumwright, D G (1997) Anatomy and Physiology for Speech, Language & Hearing. San Diego: Singular.

Tortora, G J, & Derrickson, B (2005) Principles of Anatomy and Physiology. New York; Chichester: Wiley. *NB there are older editions of this book eg Tortora and Grabowski (2003) in the library in addition which can also be referred to. There is a separate CD rom available for some editions.*

WEBSITES

Neuroanatomy:

The W.U.S.M. Neuroscience Tutorial:
<http://thalamus.wustl.edu/course/>

Review of Anatomy: head and neck
www.bcm.tmc.edu/oto/studs/anat.html

The Physics Classroom (Sound)

www.glenbrook.k12.il.us/gbssci/phys/Class/sound/soundtoc.html

Embryology: there are many great sites; here are some of the ones I found useful!

http://www.med.unc.edu/embryo_images/unit-welcome/welcome_https/akgs.htm

<http://sprojects.mmi.mcgill.ca/embryology/>

<http://visembryo.com/baby/index.html>

<http://embryology.med.unsw.edu.au/>

<http://embryo.soad.umich.edu/carnStages/carnStages.html>

Development of the face:

<http://embryology.med.unsw.edu.au/Notes/face.htm#Recent>

Teratogens:

<http://www.usd.edu/med/som/genetics/curriculum/2DTERAT4.htm>