Strength & Conditioning

1 Overview

Strength & conditioning (S&C) has emerged as one of the key areas of support for athletes working towards peak performance. Current research and theory in this area have progressed to the point that we can improve the ability to design and implement the most appropriate S&C programs for sports participants at all levels. There are now even several international scientific journals dedicated solely to this topic and international bodies with pathways of accreditation now exist for professionals in this field.

This course is designed specifically for those wanting to apply S&C knowledge, based on the findings of scientific research, to coaching practice. It provides an overview of the theory and research underpinning the various aspects of strength and conditioning delivery for high performance sport. It is a distance e-learning course delivered only in on-line format to cater to the needs of those unable to participate in face to face learning modes.

The course provides students with 'cutting edge' scientific knowledge of S&C and insight enabling sound application of the knowledge in coaching practice. Students engage in a rich interactive learning environment that encourages discussion and interaction among participants sharing ideas and experiences.

2 Content

The course comprises orientation to the on-line learning environment, including the opportunities for interaction and discussion with the tutor and other participants, followed by six lessons delivered over twelve weeks on a two week cycle:

1. **Physiological Principles and Training Theory**

   Training adaptation, acute training programme variables, the strength and conditioning process, approaching training design and training variation

2. **Assessing and Monitoring Training Status**

   Testing, strength and power assessment, evaluating endurance performance, assessing speed components, balance and stability testing and musculoskeletal profiling and movement screening

3. **Metabolic Conditioning**

   Components of strength, potential adaptations to strength training, sport-specific strength, strength training for injury prevention, application of strength training for improving endurance performance, approach o strength training for sport, specificity of dose-response relationships with strength training experience, youth training and long term athlete development

4. **Training for Strength**

   Endurance demands of sports, parameters of endurance capacity, adaptations to endurance training, factors determining conditioning responses, training strategies to develop different aspects of metabolic conditions, approaches to metabolic conditioning for different sports and athletic events

5. **Training for Power**

   Approaching training for power or 'speed-strength', factors in the expression of explosive muscular power, speed-strength training modes for developing explosive muscular power

6. **Training to Develop Athleticism**

   Concept of athleticism, speed and agility in sport, development of components of 'sports speed', developing agility for intermittent sports, training to develop lumbopelvic 'core' stability

An indicative bibliography can be found in Appendix A

3 Learning Outcomes

By the end of the course students will be able to:

- Demonstrate an understanding of the physiological principles of training that underpin strength & conditioning.
- Demonstrate an appreciation of the theory of training and evaluate how this informs the design and delivery of strength & conditioning programs for athletes.
- Develop the ability to source and utilise resources providing up-to-date research and theory in the field of strength & conditioning.
- Demonstrate an understanding of the process of identifying physical demands, designing appropriate training interventions and selecting appropriate modes to assess and monitor physical capacity.

4 Learning and Teaching Approaches

Learning and teaching activities include *discussion forums*, individual *reflective activities, comment papers, on-line quizzes*, and *assignments*. Resources such as key textbooks and some scientific journal articles will be used to introduce students to the advanced concepts that underpin S&C of athletes and players to optimise performance and enjoyment, and to reduce the incidence of injury. Throughout the course, examples are provided to demonstrate how current knowledge is actually applied in a sporting context.

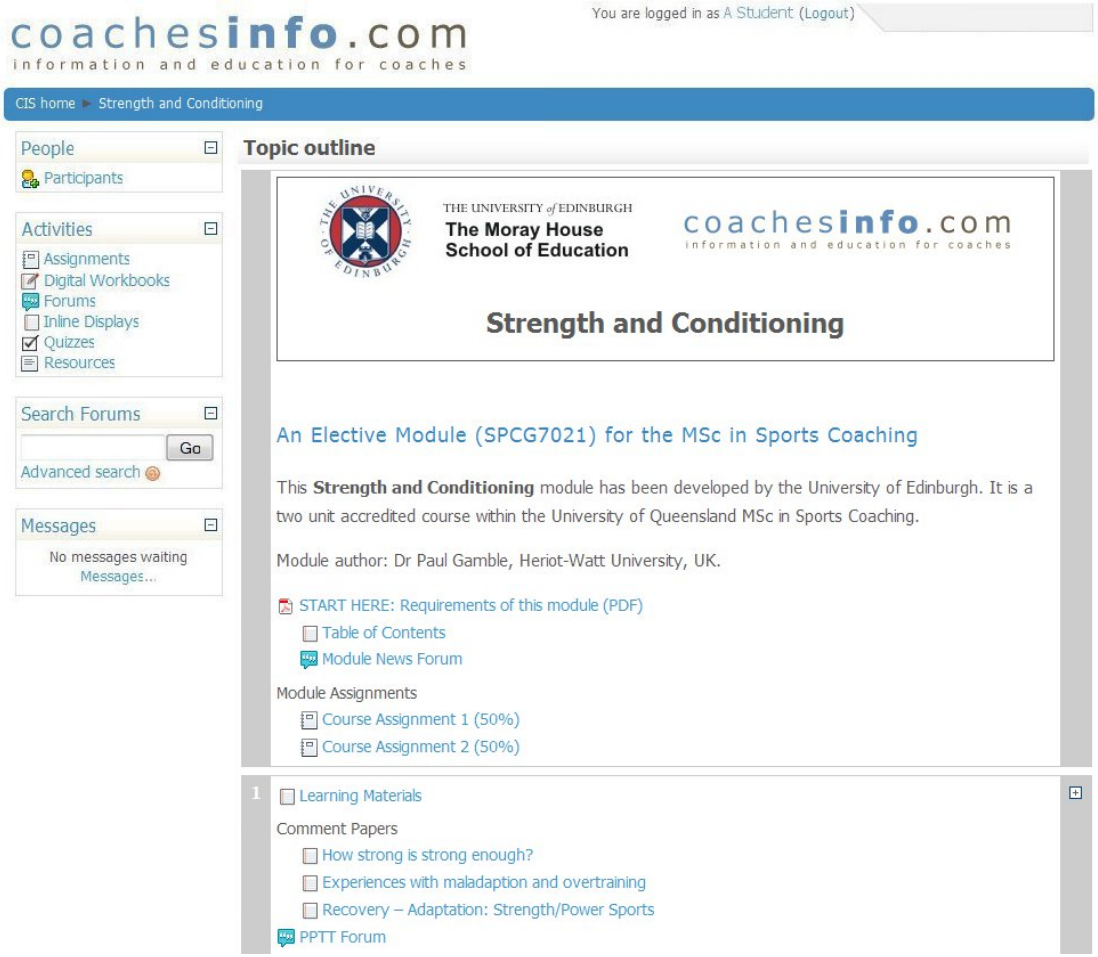
Activities such as *reflections*, *discussion papers* and *discussion forums* will encourage lateral thinking to apply the knowledge to the specific sport of interest to the student. The learning environment has been established to facilitate ready communication among students and between students and the tutor with respect to all aspects of the course. The tutor monitors and guides the discussion forums interactively.

Each lesson comprises a set of *Learning Materials* that should be completed in a two week cycle. This means that, when delivered on-campus, the entire course is completed according to a 12 week semester schedule.

The Learning Materials contain inline boxes which allow students to record their own "Reflections" as they progress through the course materials. These 'reflections' are

not assessed, though they may be inspected in cases of marginal passes to see evidence of working practice. They are stored as the student types and are compiled in a *Digital Workbook* (DWB). The DWB is the student's personal portfolio of work and can be viewed through the learning environment (and edited to reflect change of thought), and produced as a PDF booklet which may be printed.

The learning material has links to *Comment Papers* and *Discussion Forums*. Students read through the *Comment Paper* and then the comments of the other students prior to submitting their own comments to the *discussion forum*. The rationale is that students gain more from the course by engaging in these forums as they progress and will assist students to organise concepts and ideas for completing written assignments. Each of the six lessons has revision questions enabling students to revise the material and to check their level of understanding of it.



There is a discussion forum topic associated with each lesson as follows:

- ***Physiological Principles and Training Theory***:
  Discuss the 'ideal' attributes and relevant physical and physiological selection criteria for your sport. Make reference to limiting factors for different aspects of sports that are relevant to the sport, with respect to the genotype and phenotype of the aspiring athlete.

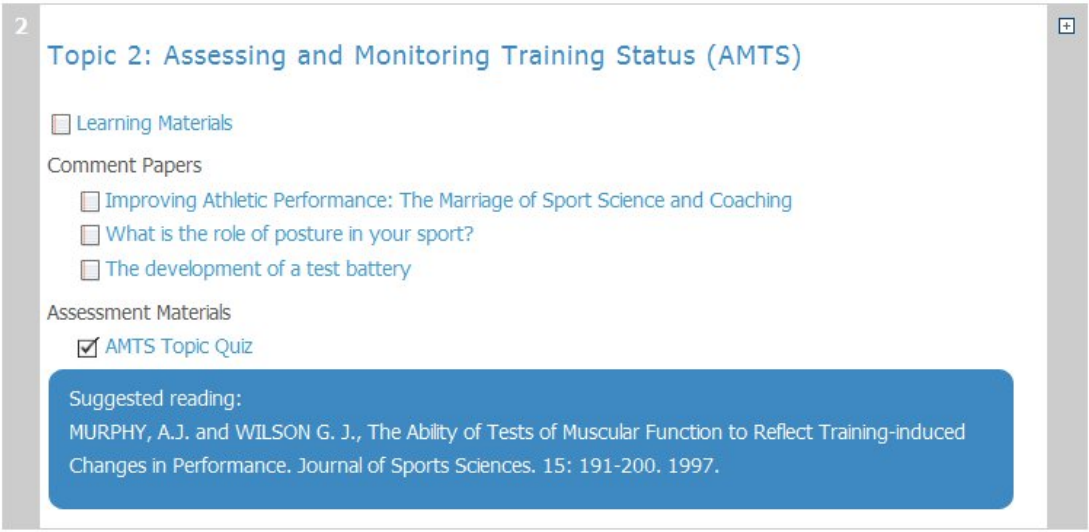
- ***Assessing and Monitoring Training Status:***
  Identify the particular tests that have the greatest perceived importance in your sport and discuss coaches' and athletes' respective viewpoints on different tests and the relevance of testing in general

- ***Training for Strength:***
  Discuss the intrinsic and extrinsic risk factors that are likely to influence injury incidence in your sport.

- ***Metabolic Conditioning:***
  Discuss the demands of your sport in terms of the different aspects of endurance covered in the course.

- ***Training for Power:***
  Discuss which of the factors underpinning explosive muscular power expression described in the course are likely to influence speed-strength performance in your sport.

- ***Training to Develop Athleticism:***
  Discuss the requirements for different aspects of athleticism as described in the course (i.e. speed, agility, lumbo-pelvic stability) for athletes in your sport.



5 Assessment

This module is assessed by two course assignments of equal weighting. Students will be required to attain a minimum 40% in each assignment to pass the course in order to exit at Certificate or Diploma Level. Students wishing to progress to Masters level must attain a minimum aggregate mark of 50% when all assignments are completed. Students will have an opportunity to resubmit any assignment which does not attain the required minimum mark of 40%.

Each distinct assessment element has its own overall weighting as shown.

Assessment Task	Weighting
COURSE ASSIGNMENTS ***Select 2 from 4***	**100%** (2 x 50%)

5.1 Submission Deadlines for Assignments

The following schedule is based on the on-campus delivery format for this course, delivered over one semester. It is suggested that all on-line students try to work to the same schedule.

- First Assignment: End of Week 8
- Second Assignment: End of Week 12

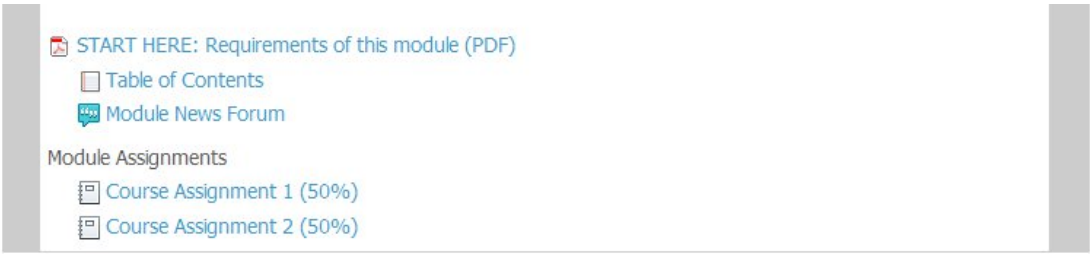
5.2 Assessment Criteria

Assignments will be marked using the following assessment criteria:

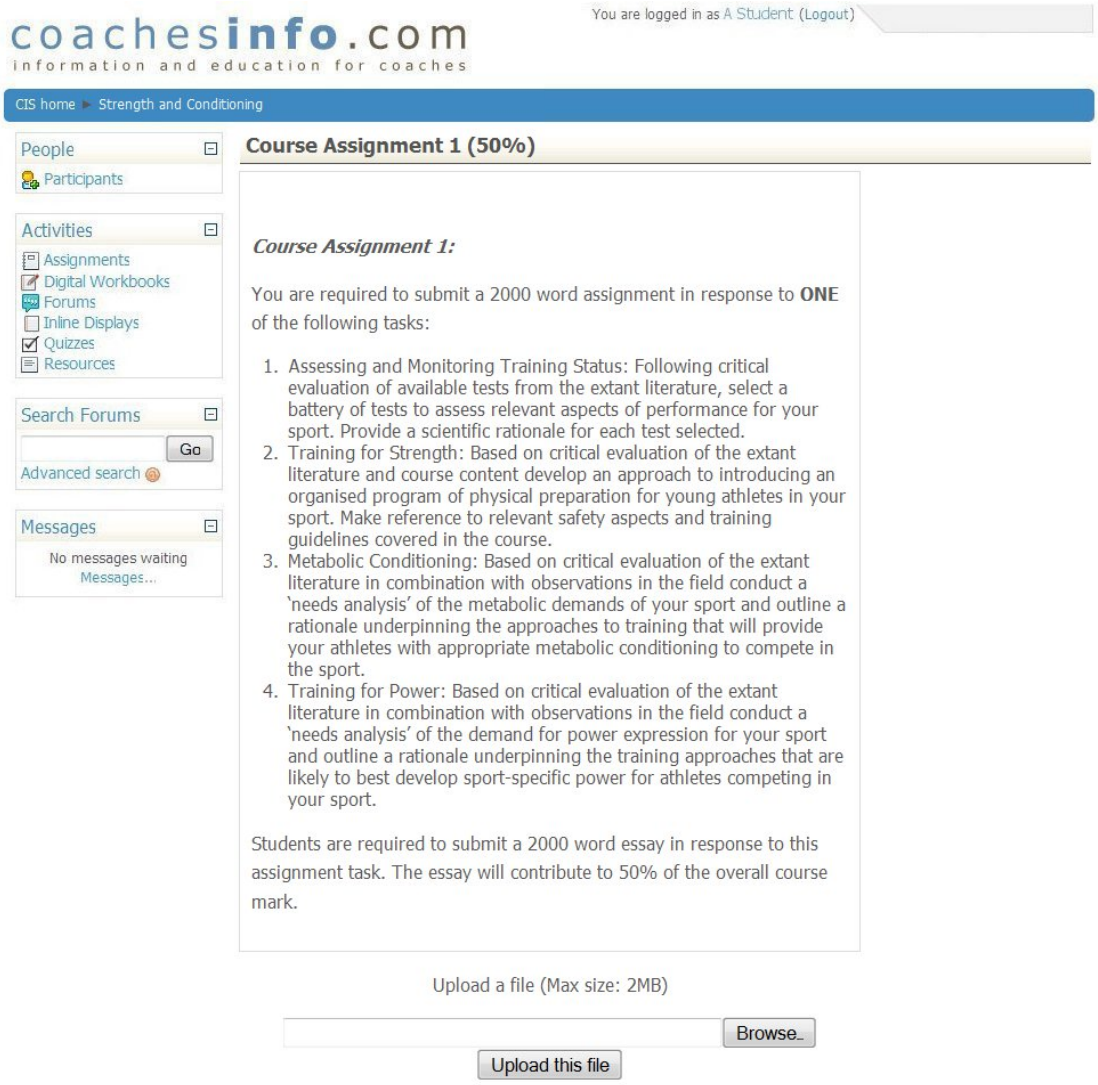
- Critical understanding of theoretical principles and concepts
- Application of theory to design and delivery of strength and conditioning programmes
- Critically review and contribute to research and thinking in strength and conditioning
- Understanding of the process of identifying physical demands, designing appropriate training interventions and selecting appropriate modes to assess and monitor physical capacity

Further details are provided in Appendix B

Tasks and the Assignment are found on the front page:



These links take you to a screen like the one below:

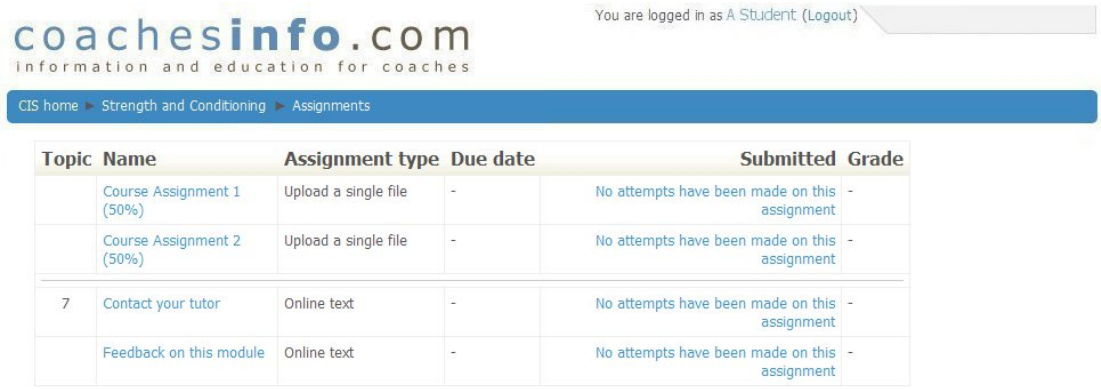


The 'Browse' button allows you to choose the location of the file(s) containing the work of the assignment or assessment on your PC. Once chosen, it can be 'Uploaded' to the environment whereupon your **Tutor** will receive an email alert notifying them it is ready for marking.

The tutor will pick the submitted file(s) and grade accordingly. He/she may include comments within the files – which can be downloaded for review – and he/she will provide some feedback and award a mark value. This **mark** may be something like 13 (out of the allocated 20% for the task or assignment). An email alert will be sent to you when the tutor has finished grading your work.

To access assignments and assessments, use the **Assignments link** in the **Activities block** in the left hand column of the learning environment.

This will take you to a screen showing a listing of all assignments for the module, with summary marks for each that has been graded. Follow the link for the individual assignment to see the Tutor's grade and remarks, and to get access to the original file and any comments that the tutor may have embedded.



Topic	Name	Assignment type	Due date	Submitted	Grade
	Course Assignment 1 (50%)	Upload a single file	-	No attempts have been made on this assignment	-
	Course Assignment 2 (50%)	Upload a single file	-	No attempts have been made on this assignment	-
7	Contact your tutor	Online text	-	No attempts have been made on this assignment	-
	Feedback on this module	Online text	-	No attempts have been made on this assignment	-

5.3 Assessment Detail

This module is assessed by two course assignments of equal weighting. Students will be required to attain a minimum 40% in each assignment to pass the course in order to exit at Certificate or Diploma Level. Students wishing to progress to Masters level must attain a minimum aggregate mark of 50% when all assignments are completed. Students will have an opportunity to resubmit any assignment which does not attain the required minimum mark of 40%.

Written submissions must be submitted by the due date. These can be submitted by uploading a text file (e.g. Microsoft Word file) and submitted as indicated in the Virtual Learning Environment.

5.3.1 COURSE ASSIGNMENTS

Weight: 100% (2 x 50%)

Task Description: Students are required to select **TWO** course assignments from the following:

1. Assessing and Monitoring Training Status: Following critical evaluation of available tests from the extant literature, select a battery of tests to assess relevant aspects of performance for your sport. Provide a scientific rationale for each test selected.
2. Training for Strength: Based on critical evaluation of the extant literature and course content develop an approach to introducing an organised program of physical preparation for young athletes in your sport. Make reference to relevant safety aspects and training guidelines covered in the course.
3. Metabolic Conditioning: Based on critical evaluation of the extant literature in combination with observations in the field conduct a 'needs analysis' of the metabolic demands of your sport and outline a rationale underpinning the approaches to training that will provide your athletes with appropriate metabolic conditioning to compete in the sport.
4. Training for Power: Based on critical evaluation of the extant literature in combination with observations in the field conduct a 'needs analysis' of the demand for power expression for your sport and outline a rationale underpinning the training approaches that are likely to best develop sport-specific power for athletes competing in your sport.

Assessment Criteria:

Assignments will be marked using the following assessment criteria:

- Critical understanding of theoretical principles and concepts
- Application of theory to design and delivery of strength and conditioning programmes
- Critically review and contribute to research and thinking in strength and conditioning
- Understanding of the process of identifying physical demands, designing appropriate training interventions and selecting appropriate modes to assess and monitor physical capacity

Submission: Each assignment should be approximately 2000 words in length and should be submitted to the tutor via the On-line Learning Environment.

6 Indicative Bibliography

- Gamble, P. (2009). *Strength and Conditioning for Team Sports - Sport-Specific Physical Preparation for High Performance*. Routledge. ISBN:978-0-415-49627-8.
- Jones, A.M., and Carter, H. (2000). The Effect of Endurance Training on Parameters of Aerobic Fitness, *Sports Medicine*. 29(6): 373-386.
- Kibler, W.B., Press J. and Sciascia, A. (2006). The Role of Core Stability in Athletic Function. *Sports Medicine.* 36(3): 189-198.
- Murphy, A.J. and Wilson, G. J., (2002). The Ability of Tests of Muscular Function to Reflect Training-induced Changes in Performance. Journal of Sports Sciences. 15: 191-200. 1997.SIFF, M.C. Functional Training Revisited. *Strength & Conditioning Journal*. 24(5): 42-46.
- Smith, D.J. (2003). A Framework for Understanding the Training Process Leading to Elite Performance. *Sports Medicine*. 33(15): 1103-1126.
- Stone, M.H., Stone M. and Sands, W.A. (2007). Principles and Practice of Resistance Training. Human Kinetics, Champaign, IL.ISBN-13:978-0-88011-706-7
- Young, W.B. (2006). Transfer of Strength and Power Training to Sports Performance*. International Journal of Sports Physiology and Performance*. 1:74-83.

APPENDIX A – Marking Criteria

The "0" column represents the standard required for an average mark. Marks accumulated across the four criteria are added, or subtracted, to determine the overall mark for this assessment task.

Criteria	- -%	- ½	0	+ ½	++%
Acquire		Most of the key facts/concepts have been accurately recalled. Most task requirements have been completed with reasonable accuracy.	Key facts/concepts have been recalled. All task requirements have been completed with accuracy.		
Apply **Analyse** **Synthesise**	Demonstrates a limited understanding of basic ideas involved and there are several errors in interpretation. Attempts to apply information but demonstrates no evidence of critical thinking or analysis.	Demonstrates a basic understanding of the ideas involved but some errors in interpretation. Applies information but demonstrates little evidence of critical analysis of ideas.	Demonstrates a good understanding of the concepts/ideas involved. Applies and adapts information demonstrating some critical analysis of ideas.	Demonstrates a good understanding of the concepts/ideas involved. Applies and adapts information demonstrating discrimination, analysis and synthesis of relevant ideas.	
Evaluate	No evidence of evaluation.	Evaluative responses are descriptive, rather than evaluative.	Evaluative responses are appropriate, however justification is superficial.	Evaluative responses are credible and justified.	Evaluative responses are credible and convincingly justified.
Communication		Communication lacks cohesion and is marred with errors in expression.	Communicates via a structured response with no major grammatical errors.	Communicates via a well-structured response.	

Listed below are explanations of some key terms used in the criteria and standards sheet:

Acquire:
Gather and present relevant information

Apply:
The ability to use learned material in new and concrete situations and includes applying rules, methods, concepts, principles, and theories. The student can summarise the information presented and can apply the findings, however do not demonstrate the ability to integrate (make connections between source information (e.g., articles, readings).

Analyse:
The ability to break material into its component parts and may include the identification of the parts, analysis of the relationship between the parts, and recognition of the organisational principles involved. The student can sort out the main points relating to the information and state their relation to each other (compare and contrast) and to the whole (i.e., "ana" "lusis" – to take apart). What kinds of categories, trends, themes, or repeated relationships can be constructed?

Synthesise:
The ability to put parts together to form a new whole. The student originates, integrates, and combines ideas into a product, plan, or proposal that is new to him or her. Students at this level can gather all relevant information, taken from analysis of the components and combine it into broader themes and principles.

Evaluate:
The ability to judge the value of material /information /argument/proposition after considering the advantages/strengths and disadvantages/weaknesses of evidence. You may hypothesise (suggest an alternative explanation) and/or make appraisal which is both authoritative and personal. Students present assignments that are organised thematically and present convincing and well-thought-out arguments that are well grounded in the literature. The conclusions made are logically and objectively argued.