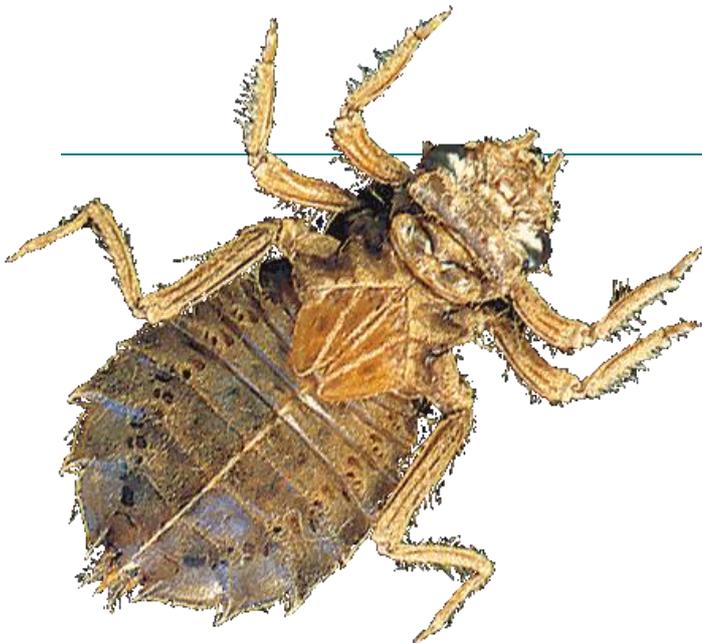




UNIVERSITY OF
CANBERRA



INSTITUTE FOR
APPLIED ECOLOGY



AUSRIVAS

Course outline

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Modified 21/07/17

Institute for Applied Ecology
University of Canberra
CANBERRA ACT 2601
AUSTRALIA

Compiled by:

Susan J Nichols, 2017

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Hawking, J.H. and Smith, F.J. (1997). *Colour Guide to Invertebrates of Australian Inland Waters, Identification Guide No. 8*. Cooperative Research Centre for Freshwater Ecology, Albury.

Contents

Welcome3

General information 3

Academic content 3

General information.....	3
Learning outcomes	5
Pre-requisites	5

Delivery of module and timetable 6

Module delivery.....	6
Semester dates.....	6
Timetable and schedules	6
Online delivery information.....	7

Staff contact..... 8

Consultation with staff	8
Consultation between students	8

Module resources 8

Online study material	8
The Websites.....	9
The UC library	9
What hardware and software must the student provide?	9

Assessment 10

Module 1. AUSRIVAS study design and site selection	10
Module 2. AUSRIVAS the habitat.....	10
Module 3. AUSRIVAS macroinvertebrate sampling and processing	11
Module 4. AUSRIVAS data analysis, predictions and indices.....	11
Module 5. AUSRIVAS practical workshop	12
Feedback	13
Referencing requirements	13
http://canberra.libguides.com/content.php?pid=273640&sid=2271039	13
Student responsibility in relation to assessment	13
Special consideration and deferred examinations	13
Individual work and plagiarism	13
Intellectual property	14

Student feedback on and formal evaluation of subject 14

Student responsibility 14

Student address and contact details	14
Enrolment	14
Attendance.....	14
Provision of information to the group.....	14
Workload	15
IT skills.....	15
Assignments.....	15

Authority of this subject outline 15

Standard provision	15
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Welcome

Welcome to the AUSRIVAS course offered by the Institute for Applied Ecology, University of Canberra. There are five AUSRIVAS modules that make up the complete course:

1. Study design and site selection;
2. The habitat;
3. Macroinvertebrate sampling and processing;
4. Data analysis, prediction and indices; and
5. AUSRIVAS practical workshop.

General information

Course title:	AUSRIVAS BIOASSESSMENT
Semester and year:	2/2018
Subject convener:	Susan Nichols
Research centre:	Institute for Applied Ecology

Academic content

General information

AUSRIVAS (Australian River Assessment System) is a standardized sampling and prediction system used to assess the health of Australian rivers. AUSRIVAS was developed under the National River Health Program (NRHP) by the Federal Government, in response to growing concern in Australia for maintaining ecological values. The NRHP involved the major environmental agency in each State and Territory and is centrally administered by Environment Australia (EA) and the Land and Water Resources Research and Development Corporation (LWRRDC). The AUSRIVAS predictive software was developed at the Co-operative Research Centre for Freshwater Ecology (CRCFE).

The term 'river health' is an umbrella term, as is human health; both can be measured and assessed by a range of different indicators. The analogy with human health provides an insight into the complexities of aquatic ecosystem damage and in turn evokes awareness and concern about human impacts on rivers. Traditionally, water quality guidelines have focused heavily on physical and chemical indicators of stream condition. Water quality indicators have undergone a shift in focus with the emphasis toward biological assessment of river condition. The recent approaches to river health assessment acknowledge the importance of physical, chemical and biological interactions, recognising the biological end point resulting from the various stressors added to and modifying aquatic systems. Aquatic macroinvertebrates are commonly used biological indicators for freshwater resources.

'Rapid' biological assessment methods have been designed so that macroinvertebrate sample collection, processing, and data analysis is fast and easily done. The broad scale assessment of Australia's rivers required the development of a nationally comparative, standardized sampling protocol. Consequently, AUSRIVAS was developed for Australia's National River Health Program (NRHP) and involves standardized sampling methods, computer software and predictive models.

AUSRIVAS assessments of river condition are based on the collection of a representative sample of the macroinvertebrate assemblage at a site. The accuracy and precision of the assessments relies on the ability of field and laboratory staff to perform to a satisfactory standard during all AUSRIVAS components. The AUSRIVAS Course is designed to establish an acceptable standard of biological assessment data. Quality control is achieved through the training component, which will reduce the variation and error in results. Quality assurance is achieved through the accreditation component, which will provide potential users with the assurance that the accuracy of results is within controlled and acceptable limits. Depending on the needs of the course participant, one or all of the AUSRIVAS modules may be completed - see <http://ausrivas.ewater.org.au/ausrivas/index.php/training-and-accreditation3/course-information>.

Please note that the state authority will confer AUSRIVAS accreditation (see <http://ausrivas.ewater.org.au/ausrivas/index.php/contact> for the list of lead agency contacts). If necessary, please clarify the details of the accreditation requirements with your State lead agency. Following completion of the AUSRIVAS course the University of Canberra will provide participants with a written statement outlining the training and accreditation criteria that have been met. The participant can then provide the agency with a copy of that document enabling the agency to issue the course participant with AUSRIVAS accreditation.

Training will equate with a "satisfactory" pass (see the AUSRIVAS course outline for details) and accreditation equates with the standards specified in the relevant State / Territory Accreditation manual available at <http://ausrivas.ewater.org.au/ausrivas/index.php/training-and-accreditation3/accreditation-manuals>. If requested by the participant, the names of trained and accredited operators can be entered on a Training and Accreditation register at <http://ausrivas.ewater.org.au/ausrivas/index.php/training-and-accreditation3/accreditation-register>.

Learning outcomes

The aims of all the AUSRIVAS modules are to provide course participants with the necessary skills and knowledge to successfully conduct assessments of river health, to an acceptable standard, using AUSRIVAS methods and; to provide uniformity and consistency in the application of AUSRIVAS methods.

The learning outcomes for each module are as follows:

Module	Learning outcomes
1. Study design and site selection	Participants will have a strong understanding of the steps involved in study design, the selection of test and reference sites, and quality assurance/quality control procedures for AUSRIVAS assessments.
2. The habitat	Participants will have an understanding of ecological assessment, field-trip preparation, and collecting site and habitat information.
3. Macroinvertebrate sampling and processing	Participants will understand the requirements for collecting and processing standardized macroinvertebrate samples from the various in-stream habitats. Note that this module will provide an introduction to family level macroinvertebrate identification and is not designed to provide comprehensive taxonomic training.
4. Data analysis, predictions and indices	Gain proficiency in operating the AUSRIVAS predictive models and interpreting the results.
5. AUSRIVAS practical workshop	Participants will gain practical experience and demonstrate proficiency in identifying and collecting macroinvertebrates and habitat data for AUSRIVAS assessments. Those participants with sufficient experience may also wish to demonstrate proficiency in macroinvertebrate identification to the standard required for AUSRIVAS accreditation (note that you will need to indicate this at the time of course application).

Pre-requisites

No pre-requisites are required to complete the AUSRIVAS modules but some knowledge of freshwater ecology would be beneficial.

Depending on the needs of the course participant, one or all of the AUSRIVAS modules may be completed. However, to gain AUSRIVAS accreditation for any course component the participant must successfully complete that component to the required standard specified in the relevant State / Territory Accreditation manual (available at <http://ausrivas.ewater.org.au/ausrivas/index.php/training-and-accreditation3/accreditation-manuals>). The lead agency in each State or Territory may have additional pre-requisites for accreditation (see <http://ausrivas.ewater.org.au/ausrivas/index.php/contact> for the list of state rep contacts).

This course provides appropriate training but lead agencies in each state and territory are responsible for approving accreditation.

Delivery of module and timetable

Module delivery

The delivery of the theory component of each module is conducted via the Internet, which requires no staff student face-to-face contact. The online study material comprises self-contained sections, which should be completed sequentially.

The AUSRIVAS practical workshop involves face-to-face staff student interaction. The workshop will be run over 5 days from the University of Canberra campus and will involve field trips to river sites in the ACT region. Transport from the University of Canberra to field sites is included in the fees.

Semester dates

Semester 2 - 2018

Online components to be completed between 14 August and 3 November 2018.

Workshop date 3-7 December 2018

Note: The workshop will be run over 5 days. The workshop includes tuition in macroinvertebrate identification on the last 1.5 days of the workshop or participants can choose to undertake accreditation for AUSRIVAS macroinvertebrate identification (Lab) component. Please note that the macroinvertebrate-identification accreditation component of the workshop is not a training component but an opportunity to gain accreditation for AUSRIVAS macroinvertebrate identification to family taxonomic level. Thus, previous experience in macroinvertebrate taxonomy is required for this accreditation component of the workshop. You would be required to identify the macroinvertebrates in the 2 samples you collect during the workshop and a 3rd reference sample containing 30 different macroinvertebrate taxa. If macroinvertebrate-identification accreditation is not required, we offer a tutorial instead. Participants can choose between Accreditation or the Tutorial, and must indicate which they will undertake.

Timetable and schedules

As a guide to study planning, the table below indicates the timeline for progress through the AUSRIVAS course.

Week	Date week begins	Module	Tasks
0	6 Aug	Registration	Obtain student password from course convenor Log on to LearnOnline (Canvas) website
1 to 3	13 Aug	Study design and site selection	Read module content 3 required readings 3 Self-test quizzes 3 Discussions topics (assessed) - DUE 1 Sept 1 Written assignment and online assessment quiz - DUE 1 Sept
4 to 6	3 Sept	The habitat	Read module content 5 required readings 1 Exercise 3 Self-test quizzes 4 Discussions topics (assessed) - DUE 22 Sept Written assignment and online assessment quiz - DUE 22 Sept

Week	Date week begins	Module	Tasks
7 to 9	24 Sept	Macroinvertebrate sampling and processing	Read module content 5 required readings 1 Online macroinvertebrate ID tutorial 3 Self-test quizzes 3 Discussions topics (assessed) – DUE 13 Oct 1 Exam Quiz – DUE 13 Oct
10 to 12	15 Oct	Data analysis, predictions and indices	Read module content 6 required readings 3 Exercises 3 Self-test quizzes 5 Discussions topics (assessed) - DUE 3 Nov 1 Written assignment – DUE 3 Nov
End week 12		All modules	Complete all online modules by 3 Nov
AUSRIVAS Workshop	3-7 Decemb er	Workshop: AUSRIVAS sampling and processing (practical)	Attend the workshop Complete the field and laboratory exercises Assessment 1: Complete AUSRIVAS habitat and site information sheets Assessment 2: sample collection, macroinvertebrate sorting and laboratory procedures Macroinvertebrate identification tutorial or demonstrate proficiency in AUSRIVAS macroinvertebrate identification (you must have indicated this at the time of course application)

Online delivery information

The theory components of all modules will be delivered online, without staff student face-to-face contact. There is a Learn online site for each module and they will be added to your Learn online page when you are enrolled. The module study materials are presented using a series of self-contained sections, each building upon the last.

The sections within each module will:

- ◆ outline the work to be undertaken
- ◆ provide the key concepts
- ◆ include readings – which are available for download via the Website
- ◆ integrate learning activities – such as:
 - self-assessment – designed to provide feedback by online multi-choice questions on the section topics.
 - discussion topics - You can share your experiences regarding the sections, ask questions and get feedback within the specific discussion topics on the bulletin board.
 - online assessment will be required using multi-choice quizzes, the bulletin board or written assignments, which can be submitted online.

Each module is divided into sections designed to focus your studies. You will be expected to progress through these modules, and sections within modules, in sequence.

Note: You will need a modem, associated software and access to the Internet via a reliable Internet Service Provider (ISP), if you do not have access through your workplace or university, (see section on 'What hardware and software must the student provide?').

We do not provide computer or modem as part of the study materials.

We do not provide Microsoft Windows operating system, Microsoft Office or Microsoft Word as part of the module materials.

Staff contact

Convener: Dr Susan Nichols, Building 3, UNIVERSITY OF CANBERRA, ACT 2601.

Tel. (02) 6201 5408 and Sue.Nichols@canberra.edu.au

Consultation with staff

- ◆ For the online components of each module the primary mode of communication between students and staff is the online forum or private email through the Canvas site.
- ◆ If needed, staff can be contacted on the above phone numbers.

Consultation between students

Students are expected to participate in the online forums.

Module resources

Online study material

The following manuals are required reading:

The AUSRIVAS Field Sampling Manuals

AUSRIVAS Predictive Modelling Manual

AUSRIVAS Software Users Manual – all manuals available online at

<http://ausrivas.ewater.org.au/ausrivas/index.php/manuals-a-datasheets>

You will be required to download the AUSRIVAS macroinvertebrate predictive modelling software from

<http://ausrivas.ewater.org.au/ausrivas/index.php/get-the-predictive-modelling-software> (software download is free).

Only eWater Toolkit members can access the AUSRIVAS models - go to <http://toolkit.ewater.org.au/member/CreateUser.aspx> to complete the details if you are not already a toolkit member (Toolkit membership is free). Then sign into the AUSRIVAS website

<http://ausrivas.ewater.org.au/ausrivas/index.php/home> with your Toolkit username and password.

To run the AUSRIVAS software each user requires access to an AUSRIVAS 'model group'. On the AUSRIVAS website, go to "My Models" on the menu and under "My Account" request access to the UC AUSRIVAS TRAINING, ACT, and THREDBO model groups using the online form. Your request will then be processed. Access to these AUSRIVAS models will be provided with enrolment in Module 4 (Data analysis, predictions and indices) at no further cost.

The AUSRIVAS Macroinvertebrate Predictive Modelling software will only operate if the most recent version is installed on the client's computer (the current version is 3.2.0).

Download the AUSRIVAS predictive model software from

<http://ausrivas.ewater.org.au/ausrivas/index.php/get-the-predictive-modelling-software> (software download is free)

Please let the course convener know if you have any problems with this process.

Note that the AUSRIVAS username and password is required to run a predictive model but not required to download and install the software.

Other readings and study material will be made available online via the University of Canberra LearnOnline Canvas website. See online 'Study Plan' for more information.

The Websites

The course Website is https://uclearn.canberra.edu.au/?login_success=1 you will need to log on with your student ID number and University password to access.

Other useful Websites include:

- ◆ Information regarding AUSRIVAS from the Website at:
<http://ausrivas.ewater.org.au/ausrivas/index.php/home>
- ◆ The MDFRC Identification and Ecology of Australian Freshwater Invertebrates
<http://www.mdfrc.org.au/bugguide/display.asp?type=1&class=19>
- ◆ This site outlines the State of the Environment reporting, which provides an assessment of the condition of Australia's inland waters
<http://www.environment.gov.au/topics/science-and-research/state-environment-reporting>
- ◆ National water quality management strategy - Australian guidelines for water quality monitoring and reporting at:
<http://www.environment.gov.au/water/quality/national-water-quality-management-strategy>

The UC library

Many electronic journals and databases can be accessed through the UC library <http://www.canberra.edu.au/library>

What hardware and software must the student provide?

To access the online materials, submit assignments and interact with tutors and other students in each module you will need to purchase or obtain a computer capable of running the following software:

- ◆ The Microsoft Windows Operating System
- ◆ A web browser
- ◆ Microsoft Office
- ◆ Adobe Acrobat Reader - download FREE Acrobat Reader at
<http://get.adobe.com/reader/>
- ◆ An email package

You will also need a modem, associated software and access to the Internet via a reliable Internet Service Provider (ISP), if you do not have access through your workplace or university.

We do not provide computer or modem as part of the study materials.

We do not provide Microsoft Windows operating system, Microsoft Office or Microsoft Word as part of the module materials.

Assessment

All assessment will comply with the *UC Assessment Policy*, which is available at the following URL:

https://guard.canberra.edu.au/policy/policy.php?pol_id=2900

Module 1. AUSRIVAS study design and site selection

Assessment for the module will involve two components.

1. A written assignment relating to the theory presented online. In your own interest, you should not submit the assessment item until you have completed the entire online work plan for all module sections.
2. Contribution to the online discussion forums.

Assignment	Due date	Mark	Requirements
Study Design and Site Selection	1 Sept	90%	Complete an assignment related to the theory covered in all topics presented in the online modules (i.e. study design, site selection and QA/QC procedures).
Online forum discussions	1 Sept	10%	Contribute to the online forum discussions for each of the topics listed at the end of each section in the online 'Study design and site selection' study guide. Submit your 2 best postings for assessment.

To pass Module 1, students must complete the assignment exercises and gain a passing mark for each of the assessments.

Module 2. AUSRIVAS the habitat

Assessment for the module will involve three components.

1. An online quiz relating to the site information theory presented online.
2. An online quiz relating to the habitat theory presented online.

Note - In your own interest, you should not submit the quizzes for assessment until you have completed the entire online work plan for all sections.

3. Contribution to the online discussion forums.

Assignment	Due date	Mark	Requirements
1. Site information online quiz	22 Sept	45%	Complete an assignment related to the theory covered in all topics presented in the online module (i.e. preparation for field work, site & field sampling information).
2. The habitat online quiz	22 Sept	45%	Complete an online quiz related to the theory covered in all topics presented in the module (i.e. preparation for field work, site & field sampling information).
3. Online forum discussions	22 Sept	10%	Contribute to the online forum discussions for each of the topics listed at the end of each section in the online 'The habitat' study guide. Submit your 2 best postings for assessment.

To pass Module 2, students must complete the assignment exercises and gain a passing mark for each of the assessments.

Module 3. AUSRIVAS macroinvertebrate sampling and processing

Assessment for the module will involve two components.

1. An online quiz relating to the theory presented online. In your own interest, you should not submit the quiz for assessment until you have completed the entire online work plan for all module sections.
2. Contribution to the online discussion forums.

Assignment	Due date	Mark	Requirements
1. Macroinvertebrate sampling and processing online quiz	13 Oct	90%	Complete an online quiz related to the theory covered in all topics presented in the online modules (i.e., sample collection, macroinvertebrate sorting and laboratory procedures).
2. Online forum discussions	13 Oct	10%	Contribute to the online forum discussions for each of the topics listed at the end of each section in the online 'Macroinvertebrate sampling and processing' study guide. Submit your 2 best postings for assessment.

To pass Module 3, students must complete the assignment exercises and gain a passing mark for each of the assessments.

Module 4. AUSRIVAS data analysis, predictions and indices

Assessment will be by two assessment items.

1. An assignment comprising of a series of 3 exercises worth 90% of the total module mark. In your own interest, you should not submit the assignment until you have completed the entire work plan for all sections of the module.
2. Contribution to the online discussion forums.

Assignment	Assignment exercises	Due date	Mark	Requirements
1. Data analysis, prediction & indices	1. Data preparation & operating AUSRIVAS	3 Nov	30%	Prepare the data set supplied and run through the appropriate AUSRIVAS model.
	2. Site assessment	3 Nov	30%	Using the same information supplied for Exercise 1 and the AUSRIVAS output, compile a table of information that you will use to assess the sites.
	3. Interpreting results	3 Nov	30%	Following on from Exercise 2 write a report detailing your interpretation of the results.
2. Online forum discussions		3 Nov	10%	Contribute to the online forum discussions for each of the topics listed at the end of each section in the online 'Data analysis, prediction & indices' study guide. Submit your 2 best postings for assessment.

Note: Module 4 is for both **training and accreditation**. To pass Module 4, students must complete all assignment exercises and gain an aggregate passing mark to pass training requirements. **Note the greater pass mark required for accreditation** for the AUSRIVAS predictive model component, it is $\geq 80\%$ for Exercises 1 and 2 and $\geq 60\%$ for Exercise 3. Student must gain accreditation standard for future access to the AUSRIVAS models.

Module 5. AUSRIVAS practical workshop

Assessment for the module will involve an assessment of your performance in the field collecting both habitat information and macroinvertebrates. Macroinvertebrate-identification assessment is optional and you must have indicated your desire to complete this assessment component at the time of course application.

Module 5 is required for accreditation in AUSRIVAS components 1) Pre-field and site information; 2) Field work, and; 3) Laboratory.

Assignment	Due date	Requirements
1. Site information, field sampling, habitat information	3-7 December	Attend the workshop and satisfactorily complete the exercises, field sampling and site information sheets for two sites in the ACT.
2. Field sampling – water & macroinvertebrate sampling	3-7 December	Attend the workshop and complete the field and laboratory exercises to a satisfactory standard, which cover sample collection and macroinvertebrate sorting procedures.
3. Macroinvertebrate identification tutorial or accreditation	3-7 December	Macroinvertebrate ID tutorial or identify, to accreditation standard, the macroinvertebrates collected from the two habitats at an ACT site and from a reference collection.

Please note: This course provides appropriate training but lead agencies in each state and territory are responsible for accreditation. Thus, to gain AUSRIVAS accreditation for any course component the participant must successfully complete that component to the required standard specified in the relevant State / Territory Accreditation manual (available at <http://ausrivas.ewater.org.au/ausrivas/index.php/training-and-accreditation3/accreditation-manuals>). The lead agency in each State or Territory may have additional pre-requisites for accreditation (see <http://ausrivas.ewater.org.au/ausrivas/index.php/contact>) for the list of state/territory contacts.

Students, who are unable to achieve the due date for assignments, should discuss the matter with the subject convenor.

On some occasions, assignments have apparently been lost before or after they have been submitted. Students are reminded that in the final analysis it is their own responsibility to ensure that assignments are available for marking, and therefore are advised to consider the following precautions:

- ◆ Retain a copy of the assignment; or
- ◆ Retain detailed notes used in the assignment so that if necessary an additional copy can be submitted.

Extensions of assignment deadlines will be given in extenuating circumstances. Contact the convenor and arrange to submit the assignment at an agreed postponed date.

Feedback

Feedback will be provided on all assessments both to the class as a whole, via the Canvas Discussion Forums, and/or individually.

Referencing requirements

The preferred citation style for all submitted material is that adopted by the Australian Journals published by CSIRO, in particular *Marine and Freshwater Research* available at <http://www.publish.csiro.au/nid/129/aid/434.htm>

Students also are asked to note the copyright requirements set out in the guide to policies and procedures available at:

<http://canberra.libguides.com/content.php?pid=273640&sid=2271039>

Student responsibility in relation to assessment

- ◆ If there is any doubt with regard to the requirements of any particular assignments or assessment procedure, the onus for clarifying the issue rests with the student who should contact the convenor about the matter.

Special consideration and deferred examinations

- ◆ In the case of illness, misadventure or unavoidable commitments at the scheduled time of an assignment, students should contact the subject convenor as soon as possible.

Individual work and plagiarism

- ◆ The University assumes students are honest and expects from students honest work in all their assignments. Good scholarship involves building on and borrowing from the work of others but this use must be acknowledged. Cheating, plagiarism, and falsification of data are dishonest practices, which contravene academic values of respect for knowledge,

scholarship and scholars. These practices devalue the quality of learning, both for the individual and for others enrolled in the course; they also diminish the reputation of a University course.

- ◆ It is taken for granted that assignments give evidence of background reading, intelligent criticism, keen observation and the development of a line of argument to support any particular stance adopted. It is also assumed that, unless explicitly stated otherwise, each assignment is totally the work of the individual submitting it and is produced specifically for the subject in question.
- ◆ The appropriation by reproducing, paraphrasing, summarising or otherwise presenting in altered form, of another person's ideas or arguments without acknowledgment is plagiarism. Plagiarism includes submitting work prepared by another author, including another student, as one's own.
- ◆ The University imposes strict penalties on students who are found to contravene the University plagiarism policy.

Intellectual property

- ◆ Students are asked to consult the guide to policies and procedures for information on intellectual property.

Student feedback on and formal evaluation of subject

Students are welcome to make comments on any aspect of the modules by emailing the convenor at any time during the teaching weeks. A formal evaluation form will be made available online near the conclusion of the modules.

Your feedback is important to us and will be used to improve the course for future participants. By completing the evaluation survey you give permission for the course conveners / instructors to publish the survey results. Your anonymity and privacy will be protected and we will take care not to publish any short answer responses that may inadvertently identify you.

Student responsibility

Student address and contact details

It is the student's responsibility to provide accurate information about their address and contact details (including current email address), and to notify the course convener of changes as soon as they occur.

Enrolment

It is the student's responsibility to ensure that they are correctly enrolled in each subject and that the subjects are correct for their course of study.

Attendance

Students are expected to complete all sections within the modules and submit assessable work by the required method and by the due date. They are also expected to participate in use of the online discussion forums.

Provision of information to the group

Announcements on the first page of the AUSRIVAS Canvas Websites for each module and those made to the email class list are deemed to be made to the whole group. It is the responsibility of the student to ensure that their current email address is on this list and that they check Canvas for messages.

Workload

The amount of time you will need to spend on study will depend on a number of factors including your prior knowledge, learning skill level and learning style. Nevertheless, in planning your time commitments you should note that as a guide, we say each online module is expected to take about 12 hours (a total of about 48 hours to complete all four), which includes time spent on Canvas, completing assessment items and other study associated with the module. Participants undertaking Module 5, 'The AUSRIVAS practical workshop', are expected to attend the 5-day workshop.

IT skills

The students should have a good understanding of the operation of their computer, have an Internet connection, have an email account and some personal Web space allocated to them.

Assignments

Students should keep a copy of any assessment item that has been submitted.

Authority of this subject outline

Standard provision

Any change to the information contained in the Sections Academic content, delivery of subject and timetable and assessment of this document, will be made by the subject convener if the written agreement of staff and a majority of students has been obtained; and if written advice of the change is then forwarded to each student enrolled in the subject at their registered term address. Any individual student who believes him/herself to be disadvantaged by a change is encouraged to discuss the matter with the subject convener.