COURSE OUTLINE

AUSRIVAS
Australian River Assessment System

UNIVERSITY OF CANBERRA | CENTRE FOR APPLIED WATER SCIENCE

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Centre for Applied Water Science
University of Canberra
CANBERRA ACT 2601
AUSTRALIA

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Cover photo: Murrumbidgee River, April 2021. Photo by Lea Knight, Centre for Applied Water Science, Canberra.

Cover image: Plecoptera – Gripopterygidae and Trichoptera – Hydropsychidae. Photos by Lea Knight, Centre for Applied Water Science, Canberra.

ACKNOWLEDGEMENT OF COUNTRY

The Centre for Applied Water Science staff and students acknowledge the Indigenous people of the lands on which they live and work and express their respect for Elders past, present and emerging. We commit ourselves to working in partnership to care for Country including all lands and waters.

CONTENTS

WELCOME

Welcome to the AUSRIVAS course offered by the Centre for Applied Water Science, University of Canberra. There are five AUSRIVAS modules that make up the complete course with modules 1 – 4 delivered online and module 5 delivered as an in-person workshop:

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

GENERAL INFORMATION

Course title:	AUSRIVAS BIOASSESSMENT
Year:	2023
Subject convener:	Professor Ross Thompson
Research centre:	Centre for Applied Water Science

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) involving the major environmental agencies in each State and Territory as a response to growing concern in Australia for maintaining ecological values. 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 the effects human activities have 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. Today's 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 obtained by different users. Quality assurance is achieved through the accreditation component, which will provide potential users of the data 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, please see: https://ausrivas.ewater.org.au/index.php/training-and-accreditation3/course-information

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: https://ausrivas.ewater.org.au/index.php/accreditation-manuals. Please clarify the details of the accreditation requirements of your State/Territory. Following completion of the AUSRIVAS course the University of Canberra will provide course 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 relevant state agency to issue the course participant with AUSRIVAS accreditation. If requested by the participant, the names of trained and accredited operators can be entered on a Training and Accreditation register at: https://ausrivas.ewater.org.au/index.php/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.

Module	Learning outcomes
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 however 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: https://ausrivas.ewater.org.au/index.php/accreditation-manuals. Each State/Territory may have additional pre-requisites for accreditation see: https://ausrivas.ewater.org.au/index.php/ausrivascontacts for the list of State/Territory contacts.

This course provides appropriate training, but each State/Territory agency is responsible for approving accreditation.

DELIVERY OF MODULE AND TIMETABLE

Module delivery

The delivery of the theory components of modules 1 – 4 are conducted online, which requires no staff-student face-to-face contact. The online study material comprises self-contained sections, which should be completed sequentially. Module 5, the AUSRIVAS practical workshop, involves face-to-face staff and 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. The cost of travel to and from the University of Canberra and accommodation is at the expense of the participant. Transport from the University of Canberra to field sites is included in the fees.

Important dates

Enrolment for online modules is available at any time during the year.

Online components to be completed between 1st of July and the 3rd of December 2023.

Module 5 Workshop date 4th to 8th of December 2023.

Registration for the Module 5 in person workshop will be available in the second half of the year and will have limited availability.

Note: The workshop will be run over 5 days. The workshop includes tuition in macroinvertebrate identification on the last 2 days of the workshop OR participants can choose to undertake accreditation for AUSRIVAS macroinvertebrate identification (Laboratory) 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. To complete the AUSRIVAS macroinvertebrate identification accreditation you will be required to identify the macroinvertebrates in the 2 samples you collect during the workshop and a 3rd reference sample containing 30 individual 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 at time of enrolment 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	Module	Tasks
0	**Enrolment**	Complete enrolment forms Log on to UCLearn (Canvas) website
1 to 3	**Study design and site selection**	Read module content Complete required readings 3 Self-test quizzes 1 Written assignment 1 Online Exam quiz
4 to 6	**The habitat**	Read module content Complete required readings 3 Self-test quizzes 1 Written assignment 2 Online Exam quizzes
7 to 9	**Macroinvertebrate sampling and processing**	Read module content Complete required readings 3 Self-test quizzes 1 Written assignment 1 Online Exam quiz

10 to 12	**Data analysis, predictions and indices**	Read module content Complete required readings and step-through exercises 3 Self-test quizzes 1 Online Exam Quiz 1 Written assignment (including data preparation)
End week 12	**All modules**	**Complete all online modules by 3rd December 2023**
AUSRIVAS Workshop	**Workshop: AUSRIVAS sampling and processing (practical)**	Attend the workshop 4th to 8th of December 2023 Compete 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 accreditation** by demonstrating proficiency in AUSRIVAS macroinvertebrate identification

Online delivery information

The theory components of all modules 1 – 4 will be delivered online, without staff student face-to-face contact. There is a UCLearn (Canvas) site for each module and they will be added to your UCLearn 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 UCLearn (Canvas) site
- integrate learning activities – such as:
    - self-test quizzes – designed to provide feedback by online multi-choice questions on the section topics.
    - online assessments – which will be required using multiple-choice quizzes, or written assignments, which are 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 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?*'. Computer and Internet access is the responsibility of the student. We do not provide Microsoft Windows operating system, Microsoft Office or Microsoft Word as part of the module materials.

STAFF CONTACT

Centralised Email: ausrivas@canberra.edu.au

Convener: Professor Ross Thompson, Building 3, University of Canberra, ACT 2601.
Tel. (02) 6206 8846 and ross.thompson@canberra.edu.au

Technical Assistant: Lea Knight, Building 3, University of Canberra, ACT 2601
lea.knight@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 email through the UCLearn (Canvas) site. If needed, staff can be contacted on the above details.

FEES

The course costs $500 ($550+ 10% GST) per module for Modules 1-4 and can be completed over 12 weeks. The 5-day practical workshop costs $2090 ($1900 + 10% GST), which includes a macroinvertebrate identification tutorial OR the macroinvertebrate identification accreditation (see course outline for description).

MODULE RESOURCES

Online study material

The following manuals available at: https://ausrivas.ewater.org.au/index.php/resources2 are required reading:

- The AUSRIVAS Field Sampling Manuals
- The AUSRIVAS Predictive Modelling Manual
- The AUSRIVAS Software Users Manual

Module 4 software and model access requirements

For module 4 you will be required to download the AUSRIVAS macroinvertebrate predictive modelling software from: https://ausrivas.ewater.org.au/index.php/get-the-predictive-modelling-software (software download is free). The AUSRIVAS Macroinvertebrate Predictive Modelling software will only operate if the most recent version is installed on your computer (the current version is 3.2.2).

You will also be required to request access to the AUSRIVAS model groups '**UC AUSRIVAS TRAINING'** and **'ACT'**. Only eWater Toolkit members can access the AUSRIVAS models so please visit 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 https://ausrivas.ewater.org.au 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'** https://ausrivas.ewater.org.au/models/?do=myaccount request access to the '**UC AUSRIVAS TRAINING'** and **'ACT'** model groups using the online form. Your request will then be processed. Access to this AUSRIVAS model group will be provided with enrolment in Module 4 (Data analysis, predictions and indices) at no cost.

Please let the centralised email – ausrivas@canberra.edu.au or the Technical Assistant 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 UCLearn (Canvas) website.

The Websites

The course Website through UCLearn (Canvas) can be accessed by logging on through **'My UC Portal'** at https://www.canberra.edu.au/current-students using your student ID number and University password.

Other useful Websites include:

- Information regarding AUSRIVAS from the Website at: https://ausrivas.ewater.org.au
- The MDFRC Identification and Ecology of Australian Freshwater Invertebrates https://www.mdfrc.org.au/bugguide/
- The State of the Environment reporting provides an assessment of the condition of Australia's inland waters https://www.dcceew.gov.au/science-research/soe
- National water quality management strategy - Australian guidelines for water quality monitoring and reporting at https://www.dcceew.gov.au/water/policy/quality

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:

- The Microsoft Windows Operating System with Microsoft Office
- Access to the Internet, web browsing and emailing capability
- Adobe Acrobat Reader - download FREE Acrobat Reader at http://get.adobe.com/reader/

We do not provide a computer 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.*

Module 1. AUSRIVAS Study Design and Site Selection

Assessment for Module 1 will involve two components:

1. **A written assignment** relating to the theory presented online.
2. **An online exam quiz** relating to the theory presented online.

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

Assignment	Mark	Requirements
1. Written Assignment - Study Design and Site Selection	**70%**	Complete an assignment related to the theory covered in all topics presented in the online module.
2. Online Exam Quiz	**30%**	Complete an online exam quiz related to the theory covered in all topics presented in the online module.

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 Module 2 will involve three components:

1. **A written assignment** relating to the theory presented online.
2. **An online exam quiz** relating to the site information theory presented online.
3. **An online exam quiz** relating to the habitat theory presented online.

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

Assignment	Mark	Requirements
1. Written Assignment – Communication Plan and Risk Assessment	**20%**	Complete an assignment related to the theory covered in all topics presented in the online module.
2. Online Exam Quiz - Site Information	**40%**	Complete an online exam quiz related to the theory covered in the site information topics presented in the online module.
3. Online Exam Quiz - The Habitat	**40%**	Complete an online exam quiz related to the theory covered in the habitat topics presented in the module.

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 Module 3 will involve two components.

1. **A written assignment** relating to the theory presented online.
2. **An online exam quiz** relating to the theory presented online.

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

Assignment	Mark	Requirements
1. Written Assignment - Macroinvertebrate Identification	**30%**	Complete an assignment related to the theory covered in all topics presented in the online module.
2. Online Exam Quiz	**70%**	Complete an online exam quiz related to the theory covered in all topics presented in the online module.

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 for Module 4 will involve **an assignment** comprising of a series of 3 exercises.

Note: In your own interest, you should not submit the assignment until you have completed the entire work plan for all module sections.

Assignment	Exercise	Mark	Requirements
1. Assignment	**1. Data preparation & operating AUSRIVAS**	**30%**	Prepare the data set supplied and run through the appropriate AUSRIVAS model.
	2. Site assessment	**35%**	Using the for Exercise 1 and the AURIVAS output, compile a table that you will use to assess the sites. **Note:** you will be required to complete part of this assessment by undertaking an online quiz.
	3. Interpreting results	**35%**	Using your results from Exercises 1 & 2 write a report detailing your interpretation.

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. **The greater pass mark required for accreditation** for the AUSRIVAS predictive model component is ≥80% for Exercises 1 and 2 and ≥60% for Exercise 3. Students 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. The macroinvertebrate-identification accreditation and assessment is optional and you must have indicated your desire to complete this assessment component at the time of course application.

Completion of Module 5 is required for accreditation in AUSRIVAS components:

1) Pre-field and site information,
2) Field work and
3) Laboratory.

Date: 4th to 8th of December 2023

Assignment	Requirements
1. Site information, field sampling, and habitat information	Attend the workshop and satisfactorily complete the exercises, field sampling and site information sheets for two sites in the ACT.
2. Field sampling – water and macroinvertebrate sampling	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	Macroinvertebrate ID tutorial or identify, to accreditation standard, the macroinvertebrates collected from the two habitats at an ACT site and from a reference collection.

Further details regarding what to bring, direction to the venue, etc. will be provided closer to the date.

Please note: This course provides appropriate training but lead agencies in each State/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: https://ausrivas.ewater.org.au/index.php/training-and-accreditation3/accreditation-manuals. The lead agency in each State/Territory may have additional pre-requisites for accreditation so please see: https://ausrivas.ewater.org.au/index.php/contact/key-contacts for the list of state or territory contacts.

Feedback

Feedback will be provided on all assessments via the UCLearn (Canvas) portal.

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

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.

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 convener about the matter.

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 centralised email or technical assistant at any time during. 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 technical assistant of changes as soon as they occur.

Enrolment

It is the student's responsibility to ensure that they are correctly enrolled in each module and that the modules 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.

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.