

SPPU Research Park Foundation – SPPU Campus Opp. Health Centre, Ganeshkhind, Pune 411007
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Executive Summary

Australian Institute of Water Sciences

The Australian Institute of Water Sciences is a training organization comprised a cohort of the very best minds in wastewater and potable water treatment in Australia. The charter of the institute is to foster World's Best Practice in the provision of Potable water training throughout Australia and overseas. The purpose of this training is to ensure the protection of the environment via efficient and effective wastewater treatment.

Domestic sewage generated across cities and towns is often collected and treated in municipal wastewater treatment plants (WWTPs) and community wastewater management systems (CWMS, formerly septic tank effluent disposal schemes or STEDS).

These drainage networks and treatment plants were originally constructed to protect the community's health and were usually located so that property would also be protected from overflows or other unforeseen incidents.

In recent decades, it has been shown that treated wastewater from these plants contains pollutants that are a significant risk to the environment.

Community expectations in developed nations have also changed and it is no longer acceptable that sewerage can lead to the loss of seagrass in the marine environment and degradation of inland waters.

AIWS contribution to Indian economic growth and potential

At least Sixty-five percent of the Indian population are domicile and work in rural areas. AIWS skills training in water and wastewater treatment as well as environmental remediation projects, provides a clear, unambiguous path for employment opportunities on a large scale. The economic effect is not only the contributions made by working rural citizens but enables rural citizens to remain in their villages and contribute considerably to local economies.

Pollution Control

In the Australian context for example, the Environment Protection Authority (EPA) in each Australian state regulates the management of solid and liquid waste in Australia, including the transport, handling, storage, treatment (including recycling and recovery) and disposal of waste, as well as activities that produce certain types of waste.

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Through its compliance efforts and reform processes, the Environment Protection Authority (EPA) is committed to establishing the right regulatory settings to support the sustainable operation of the waste and resource recovery industry by seeking to:

- minimize the risk of environmental harm occurring,
- support the highest and best, safe available use of secondary materials in accordance with the waste management hierarchy,
- provide more certainty and fairness for lawful operators, promoting investment, innovation and growth of the sector,
- stamp out illegal operators

Improper wastewater management (eg overflows, poor infrastructure maintenance, insufficient treatment) could lead to surface and groundwater pollution. The lack of adequate treatment could also lead to odor generation.

This paper provides an overview of the courses and training provided by the Australian Institute of Water Sciences, the benefits to the Central Government and State governments as well as to students and industry. In particular, this paper considers the utility of the Intermediate and Senior Certificates in Water Sciences as they apply to major projects.

For example, the outstanding success of Swachh Bharat Abhiyan, which the Central Government of India has reinforced between 2014 and 2019, has brought sweeping changes in pollution mitigation by addressing the effectiveness of proper sanitation; the discouragement of open defecation and the management of solid waste in rural areas. The continued effectiveness and growth of these initiatives depends on the skills imparted by AIWS courses.

Operator Training

Ostensibly, operator training in Australia and in other developed nations was formalised in the early 1980's to achieve standards of wastewater and potable water treatment that comply with Environment Protection Authority (EPA) expectations and are comparable to world's best practice.

The benefits of operator training are well established.

Establishment and upgrading of wastewater treatment facilities are expensive, typically in the 10's of millions of dollars and paid for by municipal rate-payers. Operator training ensures that WWTP facilities are run and maintained in accordance with both the Environment Protection Authority (EPA) requirements and the WWTP manufacturer's instructions. To that end, Operator training rationale is as follows.

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1. Longevity of plant assets.

It has been well established that WWTP asset life is prolonged by the establishment and adherence to sound operating procedures and practices. This includes identifying proper operating parameters and recognising situations where processes are failing that will have future negative impacts on WWTP assets.

2. Meeting Environment Protection Authority (EPA) licence requirements

Failure to meet Australia Environment Protection Authority (EPA) discharge licences as described above results in prosecutions under the Environmental Protection Act. In most proven cases, this will mean substantial fines up to several million dollars depending on the severity of the breach. In all cases WWTP operating entities are required to make good the damage caused by non-compliance.

3. Ongoing / Recurring costs / Efficiency

The cost of maintaining and running WWTP facilities involves maintenance, labour and consumables such as chemicals. Inadequate training leads to overuse of chemicals and other consumables adding to the running costs of wastewater treatment. This also extends to processes such as sludge treatment and dewatering both of which incur high costs in wastewater treatment. Australian practice is to train operators to manage and optimise chemical dosing as well as undergo training in the proper management of sludge.

4. Occupational health and safety

Before the various Workplace State Safety Acts were updated in Australia, there was little operator training that was specific to workplace safety. World's Best Practice now dictates that operators are training in the safe management of each process in the wastewater treatment cycle. This not only reduces immediate and long term injury to operators and other workers but reduces overall running costs by reducing operator absences.

5. Environment

World's Best Practice involves consideration of the environment. This includes the broader environment that extends to waterways and rivers, coastal areas for recreation and ports, parks and gardens and urban amenities. Wastewater directly impacts these environments. To that end, training of WWTP operators has a direct beneficial effect on protecting these environments.

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The Australian Institute of Water Sciences recognizes that the most important aspect of providing protection to the environment as well as workplace health and safety to operators is to ensure that operators and other personnel are adequately trained.

The training programs offered by the AIWS are carefully chosen to

- Represent a wide variety of contemporary treatment methods
- Maps precisely with training programs offered in Australia and worldwide
- Has both Intermediate and Senior Certificate levels that represent the different responsibilities and knowledge required of operators
- Provide training that is widely accessible by offering affordable courses.
- Conducts leading edge research and development in water and wastewater treatment methodologies.
- Provides consulting and the very best advice from leading experts to advance the practice of water and wastewater treatment throughout the world.
- To promote and encourage effective water and wastewater treatment that enhances local and wider environments by effective training.

In Summary, by imparting training to the working staff of the wastewater management departments at village, district and state level, the overall efficiency of plants will be improved significantly, including minimising the maintenance and repair costs, providing optimum utilisation of plants through a significantly enhanced life cycle.

Wastewater pollution

While urban countries has imported and / or developed considerable modern technology to treat industrial and domestic wastewater before it is discharged to public water courses and ultimately reaching the river (surface water and groundwater infiltration), the effectiveness of these infrastructures as mitigation units against public water pollution is questionable for a number of reasons, not limited to:-

- Lack of operator skills – No formal skills training is given to operators and / or supervising engineers and scientists
- Failing infrastructure – because of inadequate or minimal skills training
- Inadequate planning – infrastructure planning inadequately considers population and industry growth.
- Running costs – local government does not give high priority to wastewater treatment infrastructure when formulating budgets.

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- Inadequate monitoring – Local municipal control boards are not providing sufficient supervision and / or applying proper, timely monitoring programs.
- Insufficient or inadequate enforcement of breaches of Environment Protection Authority guidelines as well as different expectations from each State authority.

Solutions

Legislation / Regulation and Training

- While not all the reasons for pollution listed above are easily solved, two main factors can be dealt with quickly and fast-tracked by legislation and / or regulation.
- Legislation and / or regulation, enforced from the Central Government requiring treatment plant operators to hold a licence to operate / supervise a treatment plant which is obtained by completing the Intermediate or Senior Certificate in Water Operations (See below).
- Legislation and / or regulation, enforced from the State Government requiring treatment plant operators to hold a Pollution Control Board licence to operate / supervise a treatment plant which is obtained by completing the Intermediate or Senior Certificate in Water Operations (See below).
- Training and certification/ licensing of laboratory staff in the fundamentals of water and wastewater treatment via the Intermediate Certificate in Water Operations (See below), that will give them greater insight into sample origins and originating conditions.

Summary of benefits of AIWS training to Central and State governments

- Suitably qualified / licensed personnel to work on vital projects.
- Ongoing sustainable monitoring and enforcement to ensure the river environment remains clean.
- Employment opportunities for tens of thousands of new graduate engineers, diplomates and Year 12 pass-outs who graduate from AIWS courses in both government and private enterprises.
- Continued use of world's best practice in river pollution mitigation

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- Low cost pollution mitigation solution that puts the money back into the community rather than paying out to foreign entities.
- Sustainable revenues for universities and colleges running “Centres of Excellence” in environmental innovation and research.
- PPP projects with companies holding suitable licenses and AIWS trained personnel.
- Enhanced skills training that can branch out to other environmental projects.
- Stepping stone to provide other skills training that will benefit both the environment and employment opportunities
- Community health benefits derived from a sustainable clean environment and river resource.
- Lower health remediation costs to governments

Benefits for Universities / Colleges and Engineering / Science institutes.

- Availability of new courses that will necessarily attract tens of thousands on new places.
- Popularity of universities and institutes that offer the AIWS courses
- Increased revenue
- Opportunity to participate hands-on in major environmental projects.
- Creating “Centres of Excellence” and “Innovation Incubation Centres” to develop world leading technologies for environment and energy initiatives.

Benefits for students

- Enhanced local employment opportunities.
- International accredited training
- Enhance prospects for overseas employment in the fastest growing sector in the world.
- Opportunity to be involved in the largest, most important environmental initiative in the world.
- Exceptional CV additions based on experience in important, highly recognised projects.
- Enhanced immigration prospects for graduates completing “Career Experiences”.
- Opportunity to create a business serving local and overseas environmental projects.

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Course structure

In the disciplines of wastewater operator to enter skills training there are two main pathways.

- Intermediate Certificate III in Water Industry Treatment.
- Senior Certificate IV in Water Industry Treatment.

In addition, we have one introductory course for general awareness

- Certificate in Environmental Studies

Advantages and benefits to individuals and general Indian prosperity

The significant advantage of these certificate courses is the accessibility to candidates who have only completed a High School Certificate but would like to forge a career in potable water and wastewater treatment. The Certificate III offers qualification for High School Certificate holders, and Certificate IV is aimed at tertiary graduates or candidates who have completed the Certificate III and want to progress further. These certificates are eminently suited to young citizens in rural areas whose only option at the moment, after completion of their HSC or degree is to migrate to already crowded metropolitan areas to find employment. These courses create significant opportunities for local employment and encourages them to remain in their villages and districts. The positive impact of State and Central Government economic growth and contribution to social cohesion is unquestionably enormous.

Intermediate Certificate in Water Industry Treatment (Cert III)

Course Code: NWP30315

This course is designed for general and entry level treatment plant operators and candidates who wish to apply for positions of treatment plant trainee. The course is designed to run over 100 hours on campus.

Course duration:	120+ hours contact
Education Prerequisite:	H.S.C. Pass
Learning Mode:	On Campus
Assessment	Written Exam / Demonstrations

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Course Units

BSBWHS301 Maintain Workplace Safety

This unit is designed to equip operators with the necessary knowledge and skill to operate a water or wastewater treatment plant safely with the focus on the safety and health of personnel.

FSKNUM21 Mathematical Calculations

This unit is designed to equip operators with the necessary knowledge and skill to make the necessary calculations that not only informs the operator of the status of the treatment plant but the correct amount of chemicals. This is essential for correct operation and cost management.

NWPGEN001 Apply Risk Management

This unit is designed to equip operators with the necessary knowledge and skill to understand and quantify risk. This enables operators to make correct decisions with respect to problems that might arise. This will not only benefit the infrastructure but lead to fewer problems and increase longevity of the plant.

NWPGEN004 Assess Implement & Report Environmental Procedures

This unit is designed to equip operators with the necessary knowledge and skill to understand environmental responsibilities that apply to the plant and the local community. This includes the impact of various treatment procedures on local communities, local flora & fauna, rivers, canals, coastlines etc.

NWPGEN008 Sample and Test Waste Water

This unit is designed to equip operators with the necessary knowledge and skill to take samples correctly as well as perform proper calibrations and field tests.

NWPTRT015 Operate and Control Coagulation and Flocculation Processes

This unit of competency describes the skills required to monitor, operate and control coagulation and flocculation processes and to measure and report on system performances and quality control. The ability to identify faults, determine and apply technical adjustments and conduct chemical dosing procedures.

NWPTRT033 Operate and Control DAF

This unit is designed to equip operators with the necessary knowledge and skill to correctly operate Dissolved Air Flotation treatment processes

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NWPTRT041 Operate and Control Granular Media Filter

This unit is designed to equip operators with the necessary knowledge and skill to correctly operate Granular Media Filter treatment processes

NWPTRT043 Operate and Control Membrane Filter

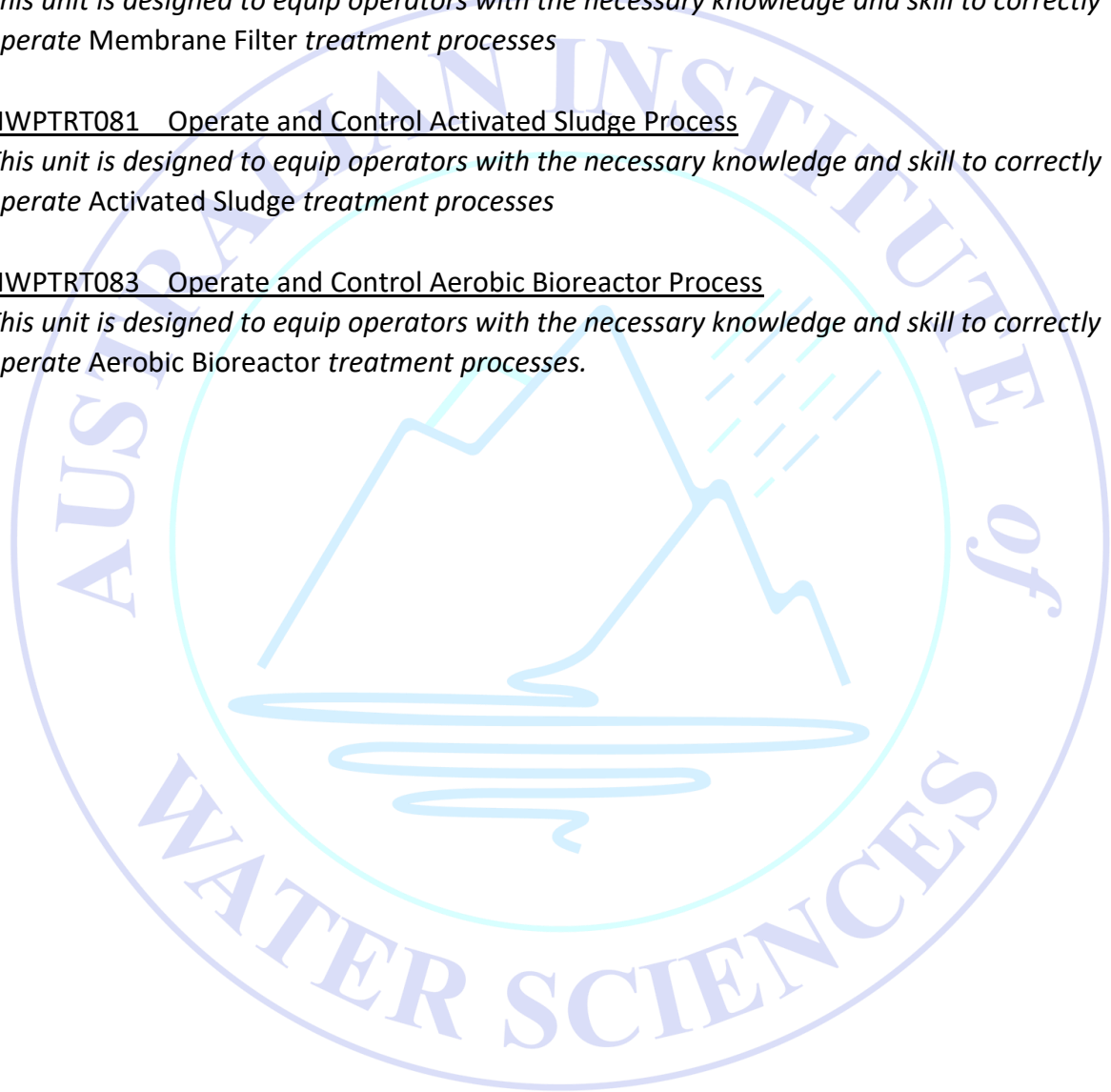
This unit is designed to equip operators with the necessary knowledge and skill to correctly operate Membrane Filter treatment processes

NWPTRT081 Operate and Control Activated Sludge Process

This unit is designed to equip operators with the necessary knowledge and skill to correctly operate Activated Sludge treatment processes

NWPTRT083 Operate and Control Aerobic Bioreactor Process

This unit is designed to equip operators with the necessary knowledge and skill to correctly operate Aerobic Bioreactor treatment processes.



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Senior Certificate in Water Industry Treatment (Cert IV)

Course Code: NWP40615

This course is designed for experienced water treatment plant operators and / or candidates who have completed the Intermediate Certificate in Water Industry Treatment (NWP30315) and who want to apply for senior positions of treatment plant operations. The course is 9 modules and designed to run over 100 hours on campus.

Course duration:	120 - 150 hours contact
Education Prerequisite:	Graduate or Cert III in Water Industry Treatment
Learning Mode:	On Campus
Assessment	Written Exam / Demonstrations

Course Units

NWPGEN002 Ensure Compliance with Water Industry Standards Guidelines and Legislations

This unit describes the skills required to ensure compliance with the risk management principles established in the Drinking Water Guidelines (DWG), Sewage Quality Management Guidelines and Guidelines for Water Recycling (GWR) which contribute to the improved management of water supply systems and the reduction of water quality risks for water supplies.

This unit applies to those working in all roles in the water industry.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organisational policies and procedures must be consulted and adhered to.

Those undertaking this unit would mostly work independently, with supervision responsibilities, while performing complex tasks in a range of contexts.

NWPGEN005 Coordinate and Monitor the application of environmental plans and procedures

This unit describes the skills required to monitor and coordinate the application of environmental plans and procedures to specific projects and to develop environmental procedures for the local work area.

This unit applies to those working in the water industry with a specific responsibility for ensuring that all relevant environmental plans and policies are applied to each project and work site within the scope of their job role, and for ensuring that environmental plans and policies are implemented, monitored, reviewed and reported according to organisational and statutory requirements.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organisational policies and procedures must be consulted and adhered to.

Those undertaking this unit would work autonomously while performing complex tasks, in a range of familiar contexts.

BSBCUS401 Co-ordinate implementation of customer service strategies

This unit describes the skills and knowledge required to advise, carry out and evaluate customer service strategies.

It applies to individuals who have well developed skills and a broad knowledge of customer service strategies for addressing customer needs and problems, and who may provide guidance or delegate work related tasks to others.

BSBSMB407 - Manage a small team

This unit describes the skills and knowledge required to select, induct, train and develop staff members to enhance business operations within the parameters of all relevant legislative requirements.

It applies to individuals who operate a small business that stands alone, or is part of a department within a larger organisation. Individuals in this role have a good knowledge of industrial relations and team management and use effective, responsive and supportive communication in workplace interactions.

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BSBWHS404 Contribute to WHS hazard identification, risk assessment and risk control

This unit describes the skills and knowledge required to contribute to the processes of identifying work health and safety (WHS) hazards, assessing WHS risks, and developing, implementing and evaluating risk controls according to legislative and organizational requirements.

It applies to individuals who contribute to WHS risk management processes in their work role in a range of industry and workplace contexts.

NWPGEN013 Apply Principles of Chemistry to Water System and Processes

This unit describes the skills required to identify and apply to water systems and processes the principles of chemistry, and to select the relevant and effective chemicals required for specific processes.

This unit applies to a range of operational roles within the water industry and is fundamental to all quality monitoring and treatment processes.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organizational policies and procedures must be consulted and adhered to.

Those undertaking this unit would work independently while performing complex tasks within a range of contexts.

NWPGEN014 Sample and Test Trade Waste Water

This unit describes the skills required to collect and prepare trade wastewater samples, perform basic field based tests and conduct and record analysis.

This unit applies to those working in the water industry but might be relevant to others.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organizational policies and procedures must be consulted and adhered to.

Those undertaking this unit would work under indirect supervision, while performing complex tasks in familiar contexts.

NWPTRD001 Evaluate, Implement and Monitor Standard low risk trade waste discharge approvals

This unit describes the skills required to assess and process applications for standard low risk trade waste discharges from retail commercial and light industrial organizations; monitor compliance with the trade waste discharge approval issued; and renew, amend, suspend or revoke trade waste approvals.

This unit applies to those working as trade waste officers or inspectors with a specific responsibility for managing applications and approvals for standard low risk liquid trade waste discharges to wastewater collection systems from small commercial and light industrial organizations.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organizational policies and procedures must be consulted and adhered to.

Those undertaking this unit would work independently, while performing complex tasks, in a range of familiar contexts. The level of responsibility may vary according to the size and scope of the trade waste system.

NWPTRD024 Establish connections of Water and Waste Water System

This unit describes the skills required to establish the connection conditions of new water, waste water and recycled water conditions by assessing the hydraulics and infrastructure capacity.

This unit applies to those working as trade waste officers within the water industry with a specific responsibility for managing applications and approvals for connection requests.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organizational policies and procedures must be consulted and adhered to.

Those undertaking this unit would work independently as part of a team making independent decisions while performing sophisticated tasks in a range of familiar contexts.



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Certificate in Environmental Studies

This course is designed for all students in general so as to gain the importance of Environmental Science and Studies. The course is designed to run over 16+ hours on campus / online.

Course duration: 16+ hours contact
Education Prerequisite: S.S.C. Pass
Learning Mode: On Campus / Online
Assessment: Written Exam / Demonstrations

Course Units

1. AIWSEIS Environment: Importance and Scope Duration – 2 hours

This unit explains the Definition, Importance and Scope of Environment. Environmental studies are the study of social sciences and to understand human interactions with the environment.

Environmental issues the world is facing, ranging from local problems such as ground water depletion to global problems like climate change.

How this unit can be relevant to you all and how it will benefit you from having this knowledge.

2. AIWSWPS Environmental Procedures and Workplace Safety Duration – 2 hours

This unit is designed to describe the skills and knowledge required to implement and monitor an organization's work health and safety (WHS) policies and procedures in the relevant work area.

3. AIWSIWWT Introduction to Water & Waste Water Treatment. Duration – 2 hours

This unit is designed to describe the water resources highlighting the current scenario pertaining to water, how it is utilized, what are the challenges the world is facing, how water and waste water treatment is done.

4. AIWSISWM Introduction to Solid Waste Management Duration – 2 hours

This unit is designed to equip students with Solid Waste. How Solid Waste is generated, Its impact on the society and environment. In brief how to tackle solid waste and treat it.

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5. AIWSIEWM Introduction to E-Waste Management Duration – 2 hours

This unit introduces students to E-Waste and its management. It describes discarded electrical and electronic devices. How to manage e-waste and dispose of e-waste.

6. AIWSIHWM Introduction to Hazardous Waste Management Duration – 2 hours

This unit explains how Hazardous Waste is generated for eg. from chemical manufacturing etc. Who is responsible to these waste and how to control it. Hazardous waste can be managed efficiently and effectively. An introduction to Hazardous Waste and its management.

7. AIWSIES Introduction to Eco-System Duration – 2 hours

This unit helps us in understanding the Eco-system. Structure and function of an Eco-system, Its producers, consumers and decomposers. A short explanation on Forest, Desert and Aquatic Eco-system.

8. AIWSCC Climate Change – How to Adapt Duration – 2 hours

This unit explains how the climate is changing rapidly, who is responsible for it, Our responsibility as an individual and finally 'How to Adapt to this rapid change'.

Conduct of the courses

Trainers

The course instructors will normally be trained civil and / or environmental engineers who complete the train the trainer course that is run periodically depending on the number of trainers required.

AIWS / University professors and lecturers will conduct Train-the-trainer courses throughout at specific school/college and university campuses as required.

In addition, AIWS will also offer "Train the Trainer" programs to junior and / or senior engineers employed at district and rural environmental departments, who can then become qualified to conduct AIWS certificate courses for rural potable water and wastewater plant operators and new recruits.

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Instruction and Assessment (Certificate III and IV only)

Instruction will be done on campus with necessary access to facilities such as overhead projectors and laboratory equipped with the equipment that matches the tests that are demonstrated in classes.

Assessment is conducted as on campus examinations and demonstrations.

- On campus written exams
- On campus demonstrations
- Field demonstrations such as sampling, field tests and safety procedures.

Certification (All Courses)

Certificates will be awarded either jointly or separately by Australian Institute of Water Sciences and the University conducting the courses. Only students who have satisfied the conditions for award of the certificate will be included. The Australian Institute of Water Sciences will vet and approve every student for certification.

Recognition of prior learning (Certificate III and IV only)

Recognition of prior learning with respect to individual units will be considered to the maximum of 4 units per course. These units will still attract the full fee; however students will not be required to sit the classes or assessments for those units.

Summary of benefits for students (Certificate III and IV only)

Completion of the either or both the Intermediate and Senior Certificate in Water Operations provide substantial immediate and long-term benefits to students namely.

- Qualifications recognized internationally
- Increased job prospects in home country and Internationally across a range of environmental disciplines
- Substantial credit points towards immigration applications in Australia
- Access to advertised jobs listed in Australia under 457 Visa conditions.
- Access to possible sponsorship by Australian industry seeking specific skills
- Further education opportunities to gain higher qualifications at Australian tertiary colleges and universities.

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Other issues

This document is an outline only and not expected to cover every eventuality. Individual issues will be negotiated and resolved between AIWS and our partner training provider.

Thank you,

Atul Bhakta

Director – Operations

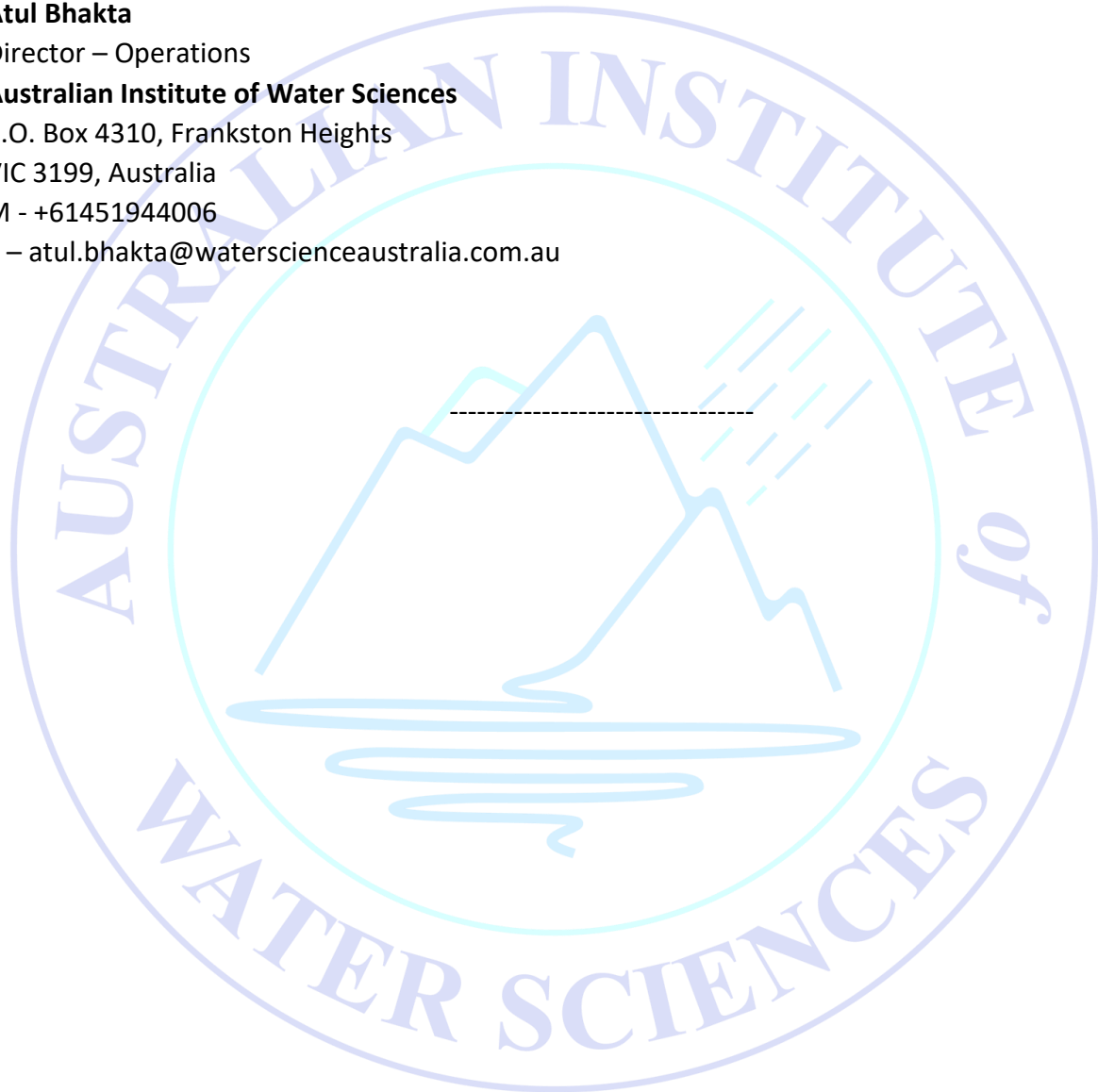
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